CASSELL'S
ENCYCLOPÆDIA
OF GENERAL INFORMATION

WITH COLOURED PLATES AND MAPS
AND NUMEROUS FULL-PAGE ENGRAVINGS

A—BEAS

SPECIAL EDITION

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CASSELL'S
ENCYCLOPÆDIA

A, the first letter in nearly every alphabet; it may be sounded, in English, in various ways—as *in* fate, fare, father, fat, amidst, fall, what, and Thames. In music A is the sixth note of the scale of C major. A is frequently used as an abbreviation. [ABBREVIATIONS.]

A 1, a symbol used in nautical language to signify a vessel of the first class at Lloyd's; hence, figuratively, anything very excellent.

Aa, a river in the province of North Brabant, Holland, flowing N.W. past Bois-le-Duc into the Meuse. The Duke of York was defeated on its banks by the French (Sept. 15, 1794). A dam at Bois-le-Duc prevents the Rhine making another exit into the North Sea. The name is allied to the Latin *aqua* (water), and consequently is applied to many other small rivers in North Europe.

Aachen (Fr., Aix-la-Chapelle; Lat., Aquisgranum), an important town in a province of the same name, situated 38 miles S.W. of Cologne in

AACHEN CATHEDRAL.

Rhenish Prussia. Apart from its pleasant situation and its celebrity as a health resort on account of its sulphur and chalybeate springs, Aachen possesses a never-failing source of attraction to visitors in its historical antiquity, and more particularly in its cathedral. This splendid building, of which the oldest portions date back to 796, is a specimen of the Byzantine style, and forms an octagon in shape, surrounded by various additions which make it outside a sixteen-sided figure. In the octagonal chapel is the tomb of Charlemagne, while some of his bones are in the sacristy; and the cathedral also possesses a store of "relics," some of which are exhibited only once in seven years. Other buildings of interest are the Rath-haus (where for seven centuries the successors of Charlemagne were crowned), the public library, the gymnasium, and the theatre. Aachen is an important centre of commerce, its chief industries being the production of glass, cigars, chemicals, machinery, woollen fabrics, and silken goods. It is also of historical interest as the scene of the conclusion of various treaties of peace—one in 1668 between France and Spain, ending the war for the possession of the Spanish Netherlands; another in 1748, which ended the Austrian war of succession. In 1818 a Congress was held here, at which it was agreed that the army of the Allies should be withdrawn from France, and that France should once more resume her position as a Power, after having paid the amount agreed upon.

Aalborg, a town in the province of Jutland, Denmark, situated on the Liim Fiord where it widens into the Bredering Lake. It is the capital of the district, and does a large trade in grain, fish, skins, tallow, spirits, etc. It also possesses a school of seamanship.

Aar, a river in Switzerland, rising in the Ober and Unter Aar Gletscher, W. of the Grimsel Hospice, has a fine fall of 200 feet near Handeck, takes a N.W. course to Meiringen, flows through the Lakes of Brienz and Thun, and thence past Berne, then turning somewhat abruptly N.E. passes Aarberg, Soleure, Aarau, and Brugg, where it is joined by the Limmat and Reuss, and enters the Rhine at the village of Coblentz (Confluentia), near Waldshut. From it the Aargau Canton in the N.W. of Switzerland derives its name.

Aard-vark, any species of the African genus Orycteropus (q.v.), containing two, or perhaps three species, of which the best known is *O. capensis*, called also Earth-hog and Cape Ant-eater. It is a timid, nocturnal animal, not unlike a short-legged pig, with a long snout, large ears, tubular mouth, and long, fleshy tail, the whole surface covered with long bristly hair. There are

four digits on the fore limbs and five on the hinder ones, all armed with powerful hoof-like claws, with which the animal burrows and tears down the hills of the white ants on which it feeds, sweeping the insects into its mouth with its long extensile tongue. The flesh is much prized for food.

Aard-wolf, *Proteles cristatus*, a carnivorous mammal from South Africa. It is about the size of a fox, but with larger ears, longer legs, and a shorter and less bushy tail, and has an erectile mane along the middle of the neck and back. In colour and markings it resembles a young striped hyæna, from which, however, it may be readily distinguished by its long pointed head and a fifth claw on the fore feet. It is a nocturnal burrowing animal, feeding on carrion, larvæ, and white ants.

Aarhuus, a port on the E. coast of Jutland, Denmark. Its Gothic cathedral is the largest in Denmark. It has a good harbour and considerable trade, and manufactures of wool, cotton, and tobacco.

Aaron, a son of Amram and Jochebed, of the tribe of Levi, and brother of Moses and Miriam. When Moses went to receive the law on Mount Sinai, Aaron yielded to the importunity of the Israelites and made a golden calf for them to worship as a symbol of Jehovah. In obedience to Divine command he was appointed High-Priest, and the tribe of Levi was consecrated to the service of God. At Hazeroth he conspired against Moses, and died at the age of 123, after holding the priestly office for 40 years.

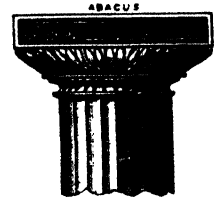
Ab. The Jewish month corresponding with July. It was during Ab that both temples were destroyed, 586 B.C. (Solomon's) and 70 A.D. (Herod's).

A-Babua, a large Negro nation heard of both by Stanley during the Emin Pasha Relief Expedition, and by Dr. Junker during his explorations of the Upper Welle Basin. Their territory lies a day's march north of the lower Aruwimi between 24° and 26° E. longitude, and is coterminous with that of the A-Barambo on the east, and the Banjias on the north, being situated mainly between the Welle and the Itimbiri (Loika) rivers. They are mentioned by Stanley in connection with the Mabodé, who lie still farther to the east, about the head-waters of Nepoko, a chief affluent of the Aruwimi, and who are described as having "square houses with gable roofs," with neatly-plastered walls and clay verandahs. From these and other indications the A-Babua are evidently an outlying branch of the "white" or southern Niam-Niams (A-Zandeh), the most civilised of all divisions of that family.

Abaca or ABAKA, the Manilla hemp, a valuable fibre obtained from the leaves of *Musa textilis*, a native of the Philippine Islands, related to the banana. The fibre is used for cordage and paper-making. The name is also applied to the plant.

Abacus. (1) An instrument sometimes used to facilitate arithmetical calculations in infant schools; it is made of parallel wires, on which are strung beads of various colours. It was used in Greece and in Rome, and is still employed in China, where it is known as Shwanpan.

In architecture, an abacus is a flat stone (Lat. *abacus*, a cushion) crowning the capital of a column. In the Tuscan, Doric, and ancient Ionic styles, it was square or flat; in the Corinthian and Composite orders, as well as in some of the later Ionic, the sides were hollowed and the angles truncated.



ABACUS. (*Doric capital from Paestum.*)

Abaddon, a Hebrew word signifying "destruction"; it is used in Revelation (ix. 11) as the name of the angel of the bottomless pit.

Abana (Barada), a river in Syria, rising in Mount Hermon (Jebel-esh-Sheikh), and flowing into the lake known as Bahret-el-Ateibeh. Damascus is situated upon it. Naaman coupled it with Pharpar (Awaj) (2 Kings v. 12). Extensive irrigation works now connect the two.

Abandonment. (1) *Marine Insurance.* The relinquishment of all claim on the part of a person who has insured a ship or goods to any portion of the same which may be saved. The person claiming compensation must give notice of his intention to abandon within a reasonable time after receiving information of the loss, any unnecessary delay being taken as an indication of his intention not to abandon. (2) *Scottish Legal Procedure.* The signification by the pursuer (or plaintiff) of his intention to withdraw from the case. This may be done at any stage before final judgment is delivered, the pursuer having to pay all costs incurred; he is, however, entitled to bring another action on the same ground. (3) *Abandonment* is also used in reference to the exposure and abandonment of infants or children under two years of age. When a child is abandoned, so that its life is endangered or its health likely to be permanently affected, the person abandoning the child is liable to penal servitude. (4) The term has significance with reference to a trade-mark, as opposed to mere non-user.

Abano, a small town in the Euganean Hills, near Padua, in Venezia, Italy, famous in ancient times for hot mineral springs (Fons Aponi or Aqua Patavina), which are still used; it possesses also large quarries of trachyte; it is said to be the birthplace of Livy.

Abatement. (1) The beating down or removing of any nuisance or illegal obstruction. (2) The quashing or judicial defeat of legal proceedings, known as Abatement of Actions, as when a writ is overthrown by some fatal exception taken to it in court; pleas designed to this effect are termed Pleas in Abatement; all dilatory pleas are considered pleas in abatement. (3) The suspense of legal proceedings on death of an essential party, or on change of interest necessitating the substitution of some new party. (4) *Of Freehold.* Forcible entry of a stranger into an inheritance, before the heir

or devisee can take possession. (5) Reductions made in legacies or annuities when the estate is not sufficient to pay in full. (6) The discount allowed for cash payment, and the deduction made for damages or loss in warehouses by the Customs House. (7) In *Heraldry*, a mark on an escutcheon denoting some dishonourable action on the part of the bearer.

Abattis, an intrenchment formed by felling trees and placing them side by side. The ends are then fixed in the earth, and the boughs, with the smaller twigs cut off, pointed towards the enemy; these structures afford cover for the defenders, and impede the advance of an attacking force.

Abattoir, the French term for a slaughter-house. Napoleon instituted the public abattoir system in Paris in 1810; and in 1855, after the removal of the cattle-market from Smithfield, an attempt was made to introduce the system into London.

Abauzit, FIRMIN, theologian and mathematician, was born in Languedoc, 1679, and said to have been of Arab origin. He fled with his mother to Geneva at the Revocation of the Edict of Nantes, went early to Holland, and met Bayle; thence he passed over to England, and became the friend of Newton, who esteemed him so highly as to consider him fit to settle the differences between himself and Leibnitz. Returning to Geneva, he assisted in translating the New Testament, and was appointed Public Librarian (1727). Rousseau and Voltaire speak highly of his learning. His works deal chiefly with theological subjects. He died in 1767.

Abbas I., Shah of Persia, seventh of the Sophi dynasty, was born in 1537, and succeeded in 1575. He displayed vigour and ability, though not without an admixture of cruelty and treachery. He put his own son to death. He extended the kingdom in all directions by conquest, wresting from the Turks the territory annexed by them, and, with the aid of an English fleet, taking the island of Ormuz from the Portuguese (1622). By his poorer subjects he was beloved, for he protected them from the extortions of officials. He died in 1628. ABBAS II., great-grandson of the above, succeeded in 1629, at the age of 13. He was a patron of the fine arts, but addicted to intemperance and violence. Died 1666. ABBAS III., the last of the Sophis. He was set on the throne (1732) by Nadir Shah at the age of 8 months. He died four years later.

Abbas Mirza, born 1785, third and favourite son of Fateh Ali Shah, who made him his heir in preference to Mahomed Ali Mirza, the firstborn. He exerted himself to introduce European civilisation into Persia. Both he and his brother died before their father, and thus a civil war was averted, in which Russia and Great Britain would have been opposed, as taking the parts respectively of Abbas and Mahomed. The two powers then assented to the nomination of Mahomed Mirza, son of the former, as crown-prince.

Abbé, originally the French equivalent for Abbot; but previous to the Revolution it was used, in a more general sense, for anyone who received the tonsure. The French king had a right to nominate *Abbés commendataires*, who without any duties obtained one-third of the revenues of their monasteries; the title was thus often applied to many who had neither taste nor ability for the clerical calling. A considerable class in society was formed by these abbés, who, not holding any appointments, often took to literary work, teaching, etc. The name is now loosely applied to any unbeneficed clerk.

Abbeokuta, West Africa, the capital of Egbaland, is situated on the Ogun river, about 81 miles from the coast, and close to the borders of Dahomey, whence hostile incursions are experienced. The inhabitants early encouraged European intercourse, and several missionary establishments have been settled there. By a treaty concluded 1852, and renewed 1861, the slave trade and human sacrifices were abolished.

Abbess, the lady superior of a nunnery, corresponding in authority to an abbot, except that she, unlike the abbot, cannot exercise purely ecclesiastical functions.

Abbeville, an ancient and prosperous town in the department of the Somme, in France, and on the river of that name. The unfinished church of

ST. WOLFRAN'S, ABBEVILLE.

St. Wolfran (1488) is a gorgeous specimen of the Flamboyant style (q.v.), but only the façade is completed according to the original design. In the streets there are to be found excellent specimens of ancient domestic architecture. The museum, which owes its existence to Boucher de Perthes (q.v.), the eminent geologist, contains a most interesting collection of implements from the drift—an epoch well illustrated in the valley of the Somme. The manufactures consist of woollen and linen goods, soap, and paper. The Somme is navigable to this point.

Abbey, a term used both of an institution consisting of persons, and of the building in which the persons dwell. As an institution it signifies a society of monks or nuns, presided over by an abbot or abbess, who withdraw themselves from the world and bind themselves to live in seclusion. As a building, the term is used to designate not

only such buildings as are actually occupied by such societies, but also cathedrals or churches, which were inhabited by monastic communities before the Reformation. [CONVENT, PRIORY.]

Abbot, a term derived from Abba (Heb. father), and originally applied to any ecclesiastic, more especially if old, but later used to signify only the president of a monastery. Later still, it was further restricted to mean the president of an abbey as distinct from the president of a priory, but eventually this latter limitation was disregarded. Abbots were most generally chosen by the monks over whom they had to preside, but, in the case of the abbots who sat in the House of Lords, the assent of the Crown was also necessary for election. Up to the sixth century all abbots were not necessarily priests, but after that date most of them held clerical orders, and in 787 they were allowed to give minor orders to their subjects. At first they were under the jurisdiction of the bishops, but in the eleventh century some of their number succeeded in throwing off the yoke, and they henceforth owned no authority save the Pope; abbots of this class were known as *exempted* or *insulated abbots*. Permission to wear mitres was frequently given to abbots, sometimes without exemption from episcopal authority, and before the Reformation twenty-seven mitred abbots and two priors sat in the House of Lords. They ceased to be peers, however, after the suppression of the monasteries.

Abbot, GEORGE, born 1562, son of a clothworker at Guildford, educated at Balliol College, Oxford, subsequently became Master of University College and Vice-Chancellor. He espoused the cause of the English reformers, and thus was brought into collision with Laud. He was made Dean of Winchester in 1599, and entrusted with the translation of the Gospels. In 1608 he visited Scotland, and advocated Episcopacy, for which he was appointed to the see of Lichfield, and subsequently transferred to London. In 1611 he was promoted to the Primacy. In politics he took the popular side, and opposed the views of James I. as to the Countess of Essex's divorce, and the king's declaration in favour of Sunday sports. He founded the hospital which still exists at Guildford, and retired to that town in 1619. In 1621 he, by accident, killed a keeper whilst shooting deer in Lord Zouch's park. Laud insisted that this act of homicide disqualified the archbishop from all priestly functions. But the king took Abbot's part, and the latter returning to court, was present at his sovereign's death, 1625. Under Charles I. Abbot was suspended; but the House of Lords, on petition, restored the archbishop to his office, which he continued to hold till his death in 1633. His successor was Laud.

Abbotsford, the home of Sir Walter Scott, upon which he lavished his earnings, and where he lived in seigneurial style, is an irregular, many-turreted building situated three miles from Melrose on the sloping bank of the Tweed. Sir Walter himself converted it from a farmhouse into a château, and his descendants preserve it as a museum of personal and national relics. The great author's apartments remain just as they were left when he died. Here may be seen some interesting memorials of the Stuart period, and a fine bust of Scott by Chantrey.

Abbreviation, the curtailment of a word by omitting some of the letters; *abbreviations* were very largely employed by the Jewish Rabbis, in ancient inscriptions, in Greek and Roman MSS., and by the mediæval copyists. Their decipherment and interpretation require special study and training. [PALÆOGRAPHY and DIPLOMATICS.] In the following list abbreviations in common use in England at the present day are given, obvious contractions like Rev. for Reverend, adj. for adjective, N. for North, etc., being omitted.

A.B.—Able-bodied seaman. Bachelor of Arts (*Artium Baccalaurens*).
A.C.—Before Christ (*Ante Christum*).
acc., a/c., or acct.—Account.
A.D.—In the Year of Our Lord (*Anno Domini*).
A.D.C.—Aide-de-camp.
Ad. lib.—At pleasure (*ad libitum*).
Æt. or Ætat.—In the year of his, or her, age (*ætatis anno*).
A.H.—In the Year of the Hegira, 622 A.D. (*Anno Hegiræ*).
A.M.—In the Year of the World (*Anno mundi*). Before noon (*ante meridiem*) Master of Arts (*Artium Magister*).
Anon.—Anonymous.
A.R.A.—Associate of the Royal Academy.
A.R.H.A.—Associate of the Royal Hibernian Academy.
A.R.S.A.—Associate of the Royal Scottish Academy.
A.S.—Anglo-Saxon.
A.U.C.—From the founding of Rome (*ab urbe condita*).
A.V.—Authorised Version.
A 1.—First class of ships.
B.A.—Bachelor of Arts.
Bart. or Bt.—Baronet.
B.C.—Before Christ.
B.C.L.—Bachelor of Civil Laws.
B.D.—Bachelor of Divinity.
B/L.—Bill of Lading.
B.L.—Bachelor of Laws.
B.M.—British Museum.
B.P.—British Pharmacopœia. Boiling point.
B.Sc.—Bachelor of Science.
B.V.M.—Blessed Virgin Mary.
C.—Centigrade. Celsius.
C.A.—Chartered Accountant.
Cantab.—Of Cambridge (*Cantabrigiensis*)
Cantuar.—Of Canterbury (*Cantuarensis*).
C.B.—Companion of the Bath.
C.C.—County Councillor. Common Council (City of London).
C.C.C.—Corpus Christi College.
C.E.—Civil Engineer.
Cent.—Hundred.
Cf.—Compare (*confer*).
C.I.E.—Companion of Order of Indian Empire.
C.I.—Order of the Crown of India.
C.M. and Ch.M.—Master in Surgery.
C.M.G.—Companion of St. Michael and St. George.
C.M.S.—Church Missionary Society.
c/o.—Care of.
Co.—Company. County.
Cr.—Creditor.
C.S.I.—Companion of the Star of India.
Cwt.—Hundredweight.
D.C.—From the beginning (*da capo*).
D.C.L.—Doctor of Civil Law.
D.D.—Doctor of Divinity.
Delt.—Drew (*delineavit*).
D.G.—By the grace of God (*Dei gratia*).
D.L.—Deputy Lieutenant.
D.Lit.—Doctor of Literature.
Do.—Ditto, the same.
Dr.—Doctor. Debtor.
dr.—Drachm, or dram.
D.Sc.—Doctor of Science.
D.S.O.—Distinguished Service Order.
D.V.—God willing (*Deo volente*).
Dwt.—Pennyweight.
Ebor.—York (*Eboracensis*).
E.C.—Established Church.
e.g.—For example (*exempli gratia*).
etc., *or* & *or &c.*—And the rest, *or* so forth (*et cætera*).
Ex.—Example.
F. *or* Fahr.—Fahrenheit.
f.—Franc.
F.B.S.—Fellow of the Botanical Society.
F.C.A.—Fellow of Institute of Chartered Accountants.
F.C.P.—Fellow of the College of Preceptors.
F.C.S.—Fellow of the Chemical Society.
F.D.—Defender of the Faith (*fidei defensor*).
Fec.—He, *or* she, made *or* did it (*fecit*).

F.E.I.S.—Fellow of the Educational Institute of Scotland.
F.F.A.—Fellow of the Faculty of Actuaries (Scotland).
F.F.P.S.—Fellow of the Faculty of Physicians and Surgeons (Glasgow).
F.G.S.—Fellow of the Geological Society.
F.K.Q.C.P.I.—Fellow of the King's and Queen's College of Physicians in Ireland.
F.L.S.—Fellow of the Linnæan Society.
F.M.—Field Marshal.
F.O.—Field Officer. Foreign Office.
F.O.B., *or* f.o.b.—Free on board.
F.P.—Fire-plug.
F.P.S.—Fellow of the Philological Soc.
F.R.A.S.—Fellow of the Royal Astronomical Society; *or* Asiatic Society.
F.R.C.P.—Fellow of the Royal College of Physicians.
F.R.C.S.—Fellow of the Royal College of Surgeons.
F.R.C.S.E.—Fellow of the Royal College of Surgeons of Edinburgh.
F.R.G.S.—Fellow of the Royal Geographical Society.
F.R.H.S.—Fellow of Royal Historical Society; *or* Royal Horticultural Society.
F.R.I.B.A.—Fellow of the Royal Institute of British Architects.
F.R.S.—Fellow of the Royal Society.
F.R.S.E.—Fellow of the Royal Society of Edinburgh.
F.R.S.S.—Fellow of the Royal Statistical Society.
F.S.A.—Fellow of the Society of Antiquarians; *or* of Arts.
F.Z.S.—Fellow of the Zoological Society.
G.C.B.—Grand Cross of the Bath.
G.C.M.G.—Grand Cross of St. Michael and St. George. [India.
G.C.S.I.—Grand Cross of the Star of
G.P.O.—General Post Office.
G.R.—George the King (*Georgius Rex*).
G.R.I., George, King and Emperor (*Rex et Imperator*).
H.B.M.—His Britannic Majesty.
H.E.I.C.S.—Hon. East India Co.'s Service.
H.I.H.—His, *or* Her, Imperial Highness.
H.M.S.—His Majesty's Ship.
Hon. or Honble.—Honourable.
H.P.—Horse Power.
H.R.H.—His, *or* Her, Royal Highness.
H.S.H.—His, *or* Her, Serene Highness.
Ib. *or* Ibid.—In the same place (*ibidem*).
Id.—The same (*idem*).
I.H.S.—Jesus Saviour of Man (*Jesus Hominum Salvator*).
Incog.—Unknown (*incognito*).
Inf.—Below (*infra*).
Inst.—The present month (instant).
Inv.—Designed (*invenit*).
I.O.U.—I owe you.
Jr. jnr.—Junior.
J.P.—Justice of the Peace.
K.C.—King's Counsel.
K.C.B.—Knight Commander of the Bath.
K.C.M.G.—Knight Commander of St. Michael and St. George.
K.C.S.I.—Knight Commander of the Star of India.
K.G.—Knight of the Garter.
kilo.—Kilometre, Kilogramme.
K.M.—Knight of Malta.
K.P.—Knight of St. Patrick.
K.T.—Knight of the Thistle.
£ *or* l.—Pound (sterling).
L. *or* lb.—Book (*liber*).
L.A.—Licentiate in Arts.
lat.—Latitude.
lb.—Pound (weight).
L.C.J.—Lord Chief Justice.
L.D.S.—Licentiate in Dental Surgery.
Lit. D.—Doctor of Literature.
L.L.A.—Lady Licentiate in Arts.
LL.B.—Bachelor of Laws (*Legum Baccalaureus*).
LL.D.—Doctor of Laws (*Legum Doctor*).
LL.M.—Master of Laws (*Legum Magister*).
log.—Logarithm.
long.—Longitude.
loq.—Speaks (*loquitur*).
L.R.C.P.—Licentiate of the Royal College of Physicians.
L.R.C.P.E.—Licentiate of the Royal College of Physicians of Edinburgh.
L.R.C.S.—Licentiate of the Royal College of Surgeons.
L.S.—The place of the seal (*loco sigilli*).
L.S.A.—Licentiate of the Society of Apothecaries.
L.S.D.—Pounds, shillings, and pence (*libræ, solidi, denarii*).
LXX.—Septuagint Version (70).
M.A.—Master of Arts.
M.B.—Bachelor of Medicine (*Medicinæ Baccalaureus*).
M.C.—Master of the Ceremonies.
M.C.C.—Marylebone Cricket Club.
M.D.—Doctor of Medicine (*Medicinæ Doctor*).
Mem.—Remember (*memento*).
M.F.H.—Master of Foxhounds.
M.I.C.E.—Member of the Institute of Civil Engineers.
M.I.M.E.—Member of Institute of Marine Engineers. [ists.
M.J.I.—Member of Institute of Journal-
M.P.—Member of Parliament.
M.P.S.—Member of the Philological Society; *or* Pharmaceutical Society.
M.R.A.S.—Member of the Royal Academy of Sciences; *or* Asiatic Society.
M.R.C.P.—Member of the Royal College of Physicians.
M.R.C.S.—Member of the Royal College of Surgeons.
M.R.C.V.S.—Member of the Royal College of Veterinary Surgeons.
M.R.I.—Member of the Royal Institute.
M.R.I.A.—Member of the Royal Irish Academy.
MS.—Manuscript. MSS. Manuscripts.
Mus. B.—Bachelor of Music.
Mus. Doc.—Doctor of Music.
N.B.—North Britain. Mark well (*nota bene*).
Nem. con.—No one contradicting (*nemine contradicente*).
No.—Number (*numero*).
N.S.—New Style.
N.S.W.—New South Wales.
N.T.—New Testament.
Ob.—Died (*obiit*).
O.H.M.S.—On His Majesty's Service.
%—Per cent.
O.S.—Old style.
O.T.—Old Testament.
Oxon.—Of Oxford (*Oxoniensis*).
oz.—Ounces.
p.—Page. pp.—pages.
P. and O.—Peninsular and Oriental Company. [bie.
P.C.—Privy Councillor. Police Constable.
Per.—For.
Per ann.—By the year (*per annum*).
Per cent.—By the hundred (*per centum*).
Pinx.—Painted (*pinxit*).
P.M.—Afternoon (*post meridiem*).
P.M.G.—Post-Master General.
P.O.—Post Office.
P.P.C.—To take leave (*pour prendre congé*).
P.P.S.—Postscript additional.
P.R.—Prize Ring. [my.
P.R.A.—President of the Royal Academy.
P.R.B.—Pre-Raphaelite Brotherhood.
P.R.I.B.A.—President of the Royal Institution of British Architects.
Prox.—Next month (*proximo mense*).
P.R.S.—President of the Royal Society.
P.S.—Postscript.
p.t. *or* pro tem.—For the time (*pro tempore*).
P.T.O.—Please turn over.
Q., Qu. *or* Qy.—Query, question.
Q.E.D.—Which was to be proved (*quod erat demonstrandum*).
Q.E.F.—Which was to be done (*quod erat faciendum*).
Q.M.G.—Quartermaster-General.
Q.s. *or* quant. suff.—As much as is sufficient (*quantum sufficit*).
q.v.—Which see (*quod vide*).
R.—Resumur. Rex, regina, king *or* queen.
R or R.—Take (*recipe*).
R.A.—Royal Academician. Royal Artillery.
R.A.M.—Royal Academy of Music.
R.C.P.—Royal College of Preceptors.
R.E.—Royal Engineers.
R.H.A.—Royal Horse Artillery. Royal Hibernian Academician.
R.H.G.—Royal Horse Guards.
R.I.P.—May he, *or* she, rest in peace (*requiescat in pace*).
R.M.—Royal Marines. Royal Mail.
R.M.A.—Royal Marine Artillery.
R.M.S.—Royal Mail Steamer.
R.N.—Royal Navy.
Rs.—Rupees.
R.S.A.—Royal Scottish Academician.
R.S.E.—Royal Society of Edinburgh.
R.S.L.—Royal Society of London; *or* Literature.
R.S.M.—Royal School of Mines.
R.S.V.P.—Please reply (*répondez s'il vous plaît*).
R.T.S.—Religious Tract Society.
R.V.—Revised Version of the Bible.
S. *or* St.—Saint.
Sc.—Engraved (*sculpsit*).
sc.—Namely, that is to say (*scilicet*).
Sc.D.—Doctor of Science.
Seq. *or* sq. seqq. *or* sqq.—The following (*sequens, sequentia*).
S.G.—Specific gravity.
S.J.—Society of Jesus (Order of the Jesuits).
S.P.C.K.—Society for the Promotion of Christian Knowledge.
S.P.Q.R.—The Roman senate and people (*senatus populusque Romanus*).
sq.—Square.
SS.—Saints.
Sup.—Above (*supra*).
s.v.—Under such a head (*sub voce*).
U.F.C.—United Free Church (Scotland).
U.K.—United Kingdom.
Ult.—Last month (*ultimo mense*).
U.P.—United Presbyterian.
U.S.—United States.
v.—Against (*versus*).
v. *or* vid.—See (*vide*).
V.A.—Order of Victoria and Albert.
V.C.—Victoria Cross. Vice-Chancellor.
viz.—Namely (*videlicet*).
V.S.—Veterinary Surgeon.
W.S.—Writer to the Signet.
Xmas.—Christmas.
Xtian.—Christian
Y.M.C.A.—The Young Men's Christian Association.
Yr.—Younger. Year.
√ (= r for radix).—The sign of the root.
$—Dollars.
4to.—Quarto.
8vo.—Octavo.
12mo.—Duodecimo.

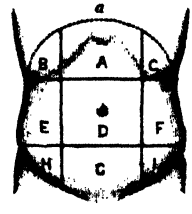
Abd-el-Kader (Sidi-el-Hadji-Ouled-Mahiddin), the son of a venerable Marabout, born in 1807 near Mascara in the province of Oran. His eloquence, prowess, and popularity early provoked the jealousy of the Dey of Algiers, and he fled to Egypt. On his return (1829) he was chosen by the tribes in the neighbourhood of Oran to lead them in an effort to expel the French from their territory. The young Emir (1832) at the head of 10,000 horsemen vigorously attacked Oran, which was held in succession by Boyer and Desmichels. Louis Philippe, fearing to be drawn into serious operations, now sanctioned a treaty (1834) by which the Emir was virtually recognised as sovereign of Oran, with the River Chelif as his eastern boundary. Having with French aid crushed some rival chiefs, he proceeded to seize a town within French borders. General Trézel, sent out to give the Emir a lesson, found himself surrounded at Macta (1835), and only escaped with the loss of his baggage and wounded. Indignation knew no bounds at Paris, and the famous Marshal Clauzel was dispatched as Governor of Algeria, with instructions to make short work with the son of the desert. The Marshal executed a pretty military promenade, but left Abd-el-Kader's power unbroken. Marshal Bugeaud next took the business in hand, and, after offering terms which were rejected, marched to the relief of the French troops beleaguered in Tlemcen. The Emir attacked him in the defile of Sikkak, but the Marshal defeated his assailant with heavy loss. The treaty of Tana was then concluded (1837 and 1838), making Abd-el-Kader a tributary of France, but giving him a large territory and ample freedom of action. After a brief interval, the Emir broke loose once more, and for some months was kept at bay by the Duc d'Orléans and Marshal Valée (1840). Marshal Bugeaud, again appearing on the scene, by means of *razzias* (q.v.) so harried the Emir's followers that they began to desert. Mascara was captured (1841), and the gallant chief with a few devoted Kabyles was driven back to the desert. He was compelled (1842) by the Duc d'Aumale to seek refuge in Morocco. The Emperor was disposed to support him, but Bugeaud by land, and the Prince de Joinville by sea (1844) frustrated this design; and as Abd-el-Kader's popularity began to undermine the Emperor's authority, the latter made common cause with the French. Many months were spent before the bold Arab could be crushed. At last the failure of a night attack on the Emperor's camp (1847) induced the Emir to surrender to General Lamoricière and the Duc d'Aumale. In violation of solemn promises, he was conveyed as a prisoner to France, and there kept in confinement at Toulon, Pau, and Amboise successively. In 1852 he was released on parole by Napoleon III. He resided successively at Broussa, Constantinople, and Damascus, where he exerted himself in defence of the Maronite Christians. He was supposed to have died at Mecca in 1873, but his death really took place in 1883.

Abdera, a town at the mouth of the river Nestus in the S.W. of Thrace. It was first founded (B.C. 656) by Timesius of Clazomenæ, and colonised after the Persian War by the Ionian inhabitants of Teos (B.C. 544). It is famed as the birthplace of Democritus, Protagoras, Anaxarchus, and other philosophers, though dense stupidity was the proverbial characteristic of its inhabitants.

Abd-er-Rahman Khan, the Ameer of Afghanistan, was born about 1830, and was recognised by the English Government as the ruler in 1880. He was the grandson of Dost Muhammad, a former Ameer, but the earlier part of his life was spent in much trouble, as civil war was constantly raging, and Abd-er-Rahman was continually taking up arms on behalf of one relative or another. In 1868, however, he retired into Russia, and it was not until 1880, the year of his assumption of the sovereign power, that he displayed marked activity. His position, at first, was the reverse of secure, but was much strengthened in 1885, when the English Government agreed to pay him a yearly subsidy of £120,000. Since that date his reign was comparatively peaceful, although in 1887 it was with difficulty that he quelled some outbreaks of the Ghilzais. He died in 1901. [AFGHANISTAN.]

Abdication, the relinquishment of any office, but more especially the throne. In England the sovereign cannot constitutionally abdicate without the consent of Parliament.

Abdomen, the lower of the two cavities into which the trunk of the human body is divided by the diaphragm. Below, the abdominal cavity is continuous with that of the pelvis (q.v.), the boundary between the two being known as the pelvic brim. For convenience of reference, the abdomen is described as consisting of three zones, an upper, middle, and lower, each zone being again divided into three parts, thus forming nine regions in all. The epigastrium (A) is the middle region of the upper zone, having on either side the right (B) and left (C) hypochondriac regions. In the middle zone is the umbilical (D), bounded on either side by the right (E) and left (F) lumbar regions; while the lowest zone presents laterally the right (H) and left (I) inguinal regions, including between them the hypogastrium (G). The liver lies mainly in the right hypochondrium but extends into the epigastrium; the spleen is found in the left hypochondrium; the stomach occupies the epigastrium and part of the left hypochondrium; and the pancreas is placed transversely across the superior zone, lying mainly in the epigastric or middle region, but extending into the lateral regions on either hand. The two kidneys are situate in the right and left lumbar regions respectively. The cæcum or first part of the large intestine lies in the right inguinal region, and the succeeding parts are the ascending



ABDOMINAL REGIONS.

colon, which passes upwards through the right lumbar region, the transverse colon, which runs transversely across the umbilical, the descending colon, which passes through the left lumbar, and the sigmoid flexure which occupies the left inguinal region; the terminal portion, the rectum, being found in the pelvis. The convolutions of the small intestine occupy mainly the umbilical and hypogastric, but extend into the right and left lumbar regions. The abdomen is lined throughout by a serous membrane, the peritoneum (q.v.), which is reflected over the several viscera, and serves to maintain them in position. One of the chief surgical advances of modern times has been made in connection with the abdomen. The operation of opening the abdominal cavity is now not infrequently undertaken for the relief of certain diseased conditions, and a large number of cases have now been conducted to a successful issue, which in former days would have been regarded as of too desperate a nature to admit of alleviation or cure.

Abdominalia, a sub-order of CIRRIPEDIA, the members of which live as parasites in *Mollusca* or other *Cirripedia*. Parasitism has as usual produced degeneration, which is especially marked in the males. *Alcippe*, one of the best known genera, is common on the English coast, frequenting the shells of whelks and similar molluscs.

Abduction, the taking away of a child from its parents, a wife from her husband, or a ward from her guardian by fraud, persuasion, or open force. In the case of a woman over 21 years of age, abduction is the taking away of a woman against her will. Various penalties may be inflicted as the gravity of the different cases demands, ranging from two years' imprisonment to fourteen years' penal servitude. The abduction of children under 14 is termed child-stealing (q.v.) or kidnapping (q.v.).

Abdul-Aziz-Khan, Sultan of Turkey, thirty-second of the Ottoman dynasty, the second son of the Sultan Mahomed II. He was born 1830, and succeeded his brother Abdul-Medjid 1861. According to Turkish precedent he had lived up to that time in great retirement; but his education had been conducted under French guidance, and he showed an interest in agriculture, having founded a school at Scutari. His reign began with considerable promise. Riza Pasha, the Finance Minister, suspected of embezzlement, was arrested; the civil list was reduced by four-fifths; the harem depopulated; the Sultan himself looked industriously into the working of all administrative departments; foreigners were permitted to hold landed estates, and it really appeared as if Turkey were about to be brought within the pale of European civilisation. Omar Pasha succeeded in crushing the Montenegrins (1862), and after a more troublesome series of operations, an insurrection in Crete, fomented by Greece, was temporarily subdued (1866–68). Abdul-Aziz visited the French Exhibition (1867), and extended his tour to London, creating in both capitals a favourable impression. On his return he established a Council of State, a college open to Mussulmans and Christians alike, and published the first instalment of a Code of Civil Law. All these innovations were not undertaken without strong opposition from the conservative Turks. Ignatieff, the Russian ambassador, was omnipotent at the palace, national bankruptcy was imminent, Bosnia and Herzegovina revolted, and finally the Sultan was deposed May, 1876. Shortly afterwards he died from the bleeding of a wound in the arm, said to have been self-inflicted. His successor, Murad II., the imbecile son of Abdul-Medjid, only reigned a few weeks when he was set aside in favour of his brother, Abdul-Hamid II.

Abdul-Hamid II. succeeded Abdul-Aziz-Khan as Sultan, 1876 (*see* above), in troublous times. Bulgaria, Servia, and Montenegro were up in arms, and in 1877 Russia, having a secret understanding with Austria, declared war. Osman Pasha's heroic defence of Plevna checked for a few weeks the march of the invaders over the Balkans, but ultimately Constantinople was surrounded and the treaty of San Stefano signed. This was followed by the Berlin Convention. In 1895 there occurred the war with Greece, in which the Turks were entirely successful. Abdul was deposed in 1909.

Abdul-Medjid, thirty-first Sultan of the Ottoman dynasty, born 1823, and succeeded his father, Mahmoud II., 1839. The young sovereign found himself at once face to face with grave political difficulties. The conservative and fanatical Turks, secretly instigated by Russia, had resolved to restore the ancient order of things, and had chosen as their leader Mehemet Ali, the powerful pasha of Egypt, already in revolt against his suzerain. Ibrahim, Mehemet Ali's putative son, won the battle of Nezib just as Abdul-Medjid came to the throne, and the Turkish fleet mutinied. The Porte was saved by Lord Palmerston's diplomacy and the intervention of the Powers, always excepting France. The Sultan, aided by Reschid Pasha, now resumed the measures of reform initiated by his father; promulgated the Tauzimut or Edict of Gulhané, giving all his subjects equal civil rights; proclaimed the equality of all creeds in the eyes of the law; and extended his protection to the Polish and Hungarian refugees of 1848. Russian intrigue at this juncture began to weave fresh toils round "the sick man," and England and France drawing together to check Russian aggression, the Crimean War ensued. The Treaty of Paris (1856) brought this chapter of history to a close, but Turkey was left weak and impoverished, a prey to intestine factions, and by no means free from Russian influence. Abdul-Medjid showed signs of premature exhaustion, and his habits became extravagant. He died in 1861.

A'Becket, THOMAS, born in London, 1118, the son of a well-to-do merchant probably of Norman race. He received a good education both in England and in France. On his father's failure in business he became a lawyer's clerk, but in 1142 the Archbishop of Canterbury gave him a post in his court, and he displayed such ability that he received from Henry II. the Chancellorship of

England (1155). In this position he was a zealous partisan of the King against ecclesiastical encroachments; he fought valiantly, if cruelly, in the War of Toulouse; enforced scutage on the clergy; and in 1159 conducted with great magnificence an embassy to France for the purpose of arranging the marriage of the heir apparent. In 1162 he was elected Archbishop of Canterbury, though as yet only in deacon's orders. His views thereupon underwent a complete change, and he stood forth as the champion of Papal authority against that of the Crown. In those days the Church represented democracy, whilst Henry and his barons were striving for a supremacy of class and race. Hence the sympathies of the Saxon population were entirely with the Archbishop. Worsted at first in the struggle, A'Becket was forced to pledge himself by oath to observe the Constitutions of Clarendon. The Pope absolved him from this obligation, which he repudiated with vehemence. He was summoned before a great Council at Northampton, and condemned to pay a heavy fine for alleged misappropriations during his Chancellorship. Upon this he claimed the protection of the Holy See, and fled to France, whence he denounced Henry. Pope Alexander III. lending him countenance. Henry, fearing the Church, was fain to seek for reconciliation, and after an interview with A'Becket (1170) agreed to his return. This agreement was violated by the King, so the Primate on reaching Canterbury excommunicated the Archbishop of York and the Bishops of London and Salisbury, who fled to join their royal master in Normandy. Henry on hearing of A'Becket's reception in England exclaimed, "Of all the cowards who eat my bread, is there not one who will free me from this turbulent priest?" This taunt moved four knights, Fitzurse, Tracy, Morville, and Brito, who forthwith proceeded to Canterbury, unknown to the King, and threatened the Archbishop, in the cathedral, with death (1170) unless he absolved the excommunicated prelates. On his refusal, A'Becket was murdered before the altar of St. Benedict. Two years later he was canonised, and his shrine—fruitful in miracles—became the most popular in England. Henry VIII. ordered his body to be exhumed and burnt as that of a traitor, and his shrine to be destroyed, but it is doubtful if the order was executed. Some remains found in the cathedral in 1889 were at one time thought to be those of the murdered prelate.

Abel (Heb. breath, vanity), the second son of Adam and Eve, slain by Cain, his elder brother, through jealousy, because Abel's sacrifice of sheep was preferred by God to the produce of the earth offered by Cain.

Abelard, PETER, the keenest thinker and boldest theologian of the 12th century, was born at Palet, near Nantes, in 1079. He studied in Paris under William of Champeaux, the head of the diocesan school, and a famous exponent of the prevailing Realism. Against this system Abelard revolted, and attached himself to Roscelinus, the upholder of Nominalism. He soon stepped into the arena himself as a philosophical disputant or lecturer; nor was it long before he drew crowds of listeners—first at Melun, then at Corbeil. He next turned to theology, which he studied under the renowned Anselm at Laon. Returning to Paris, he attained the highest fame as a theological teacher, without, however, entering the priesthood. At the age of 38 he fell in love with Heloisa, the beautiful niece or daughter of an ecclesiastic named Fulbert. Why they should not have married remains still a mystery; they unhappily preferred an illicit connection, which Fulbert discovered, and, though a form of marriage was gone through, punished by an irreparable outrage upon the lover. Abelard assumed the cowl and entered the monastery at St. Denis, Heloisa seeking refuge in the convent of Argenteuil; and, for a time, their lives appear to have been sundered. Suspicions of heresy soon began to spring up against the refined philosopher, and he removed to St. Gildas, in Brittany. He then (1120) started an independent course of lectures, and thousands flocked to hear him. A council at Soissons condemned one of his dissertations as unorthodox. In 1122 he built himself a little oratory near Troyes, which he dedicated to the Paraclete. His fame attracted many followers; a large monastery grew up; persecutions were renewed; and in 1125, to escape annoyance, he accepted the position of abbot in his former retreat at St. Gildas. Heloisa meanwhile had become prioress of Argenteuil; but the priory (1127) was claimed by the Crown. Abelard, thereupon, made over to her his establishment of the Paraclete, and she became the abbess. It is from this period that the famous letters date. In 1136 the Abbot of St. Gildas was again lecturing in Paris; but the relentless wrath of the ecclesiastics still pursued him. A council held at Sens (1140) condemned him to lifelong seclusion. Peter of Cluni prevented this sentence being carried out, and offered him a retreat in that abbey, where he spent in peace the last two years of his troublous career. He died 1142, at St. Marcellus, near Chalons-sur-Saône. A tomb in the cemetery of Père-la-Chaise, Paris, built of fragments from the Paraclete, commemorates the sad story of the ill-starred lovers.

Abelites or Abelians, the names given to a religious sect mentioned by St. Augustine: the Abelites held the principle of compulsory marriage with compulsory abstinence from its consummation, alleging that Abel lived with his wife in this manner. The sect was short-lived.

Abencerrages, a powerful Moorish family which lived in Spain from the 8th century until the 15th, when they are supposed to have been annihilated by the King of Granada. Their fall has been the subject of many poems and romances.

Aben Ezra, or Ibn Ezra (Abraham Ben Meir Ben Ezra), one of the ablest Jewish grammarians and commentators, and celebrated also as an astronomer and physician; he was born at Toledo about 1090, and lived in Italy and England, dying in 1168. His *Commentaries* on the Old Testament form the starting-point of scientific Biblical exegesis. Without neglecting Rabbinical tradition, he adopts the

literal rather than the cabalistic method of interpretation [CABBALA], bringing to bear on the text a profound knowledge of Chaldee and Arabic.

Aber, a prefix denoting the situation of a place at the mouth of a river or a confluence of waters. It is a word belonging to the Kymric branch of the Keltic stock, the corresponding Gaelic term being "inver."

Aberavon, a town in Glamorganshire, on the river Avon, 8 miles from Swansea on the road to Cardiff, and 196 from London. Though a place of great antiquity, its importance dates from the recent development of metal smelting, the district abounding in coal, iron, lead, zinc, and copper. Port Talbot, the harbour, has been much improved. Pop.(1901), 7,553.

Abercrombie, JOHN, an eminent physician, born at Aberdeen, 1781. He practised for many years in Edinburgh, and made valuable researches in pathological anatomy. His fame, however, rests on his moral and logical speculations embodied in his two works, *The Intellectual Powers of Man and the Investigation of Truth*, and *The Philosophy of the Moral Feelings*. His kindly manners and unaffected piety caused him to be much beloved. He died suddenly in 1844.

Abercromby, SIR RALPH, K.B., born at Tullibody, Clackmannanshire, 1734, and educated for the law, but at his earnest request he obtained a cavalry commission (1756) and in due course rose to the command of the 103rd Infantry. In 1783 he went on half pay, probably disliking to serve against the American colonists. He received the command of a brigade, 1793, under the Duke of York in Holland; was wounded at Nimeguen; and covered the disastrous retreat of 1794-95. Being appointed to the command in the West Indies he took (1796-97) St. Lucia, St. Vincent, Grenada, Demerara, Essequibo, and Berbice. As Commander-in-Chief in Ireland (1798) he did his best to restore order without resorting to unconstitutional means, but resigned on finding Government would not support him. In 1801 he was chosen to command the force destined to drive the French out of Egypt. After effecting a masterly disembarkation at Aboukir, he won the decisive battle of Alexandria, but stricken by a spent ball he died seven days later, March 28, 1801. Parliament erected a monument to his memory in St. Paul's Cathedral.

Abercromby, JAMES, LORD DUNFERMLINE, third son of the above, born 1776; called to the bar 1801; entered Parliament for Midhurst 1807; joined the Whig opposition, to which he rendered valuable services. Canning, on coming to power, made him Chief Baron of the Exchequer in Scotland, 1830. He was one of the first members for Edinburgh in the Reformed Parliament, of which he was elected Speaker in 1835. Resigning in 1839, he received a peerage, and died in 1858.

Aberdare, a town in Glamorganshire, 4 miles from Merthyr-Tydvil, of which parliamentary borough it forms part. The town is pleasantly situated in a valley watered by the river Cynon, and has made greater commercial progress within the last fifty years than any town in the Principality, in consequence of the abundant mineral wealth of the locality. Aberdare has kept pace with the development of its industries; it has many substantial buildings, and is well supplied with water. Near the town are vestiges of a circular British encampment, and at a short distance from it the remains of two ancient bloomeries were discovered. Pop. (1901), 43,357.

Aberdeen (GEORGE HAMILTON GORDON), 5TH EARL OF, born 1784; succeeded his grandfather, 1802; sat in Parliament as a representative peer, 1807; and was in 1814 created a peer of the United Kingdom as Viscount Gordon. He joined the Tory party, and was Foreign Secretary in Wellington's administration (1828-30). In 1841 he held the same office under Peel, and on the latter's death was regarded as head of the Peelites. In 1852 he became Prime Minister, and formed the coalition Government which was responsible for the Crimean War, 1854. His moderation towards Russia made him unpopular, and he made way for Lord Palmerston, February, 1855. He died in 1860.

Aberdeen, a town situated on the east coast of Scotland, 542 miles north from London, and 111 north from Edinburgh. It lies between the mouths of the rivers Dee and Don, in both of which salmon fishing is carried on. In its neighbourhood are

THE MARKET CROSS, ABERDEEN.

extensive granite quarries, of which material the town is built and its streets paved. From this it has received the name of the "Granite City." In the city itself are the largest granite polishing works in the United Kingdom. Other leading industries are the making of combs, paper, and textile fabrics, the preserving of provisions, and the catching of fish. Formerly celebrated for its clipper-bow ships, now superseded by iron steamships, it still does a considerable ship-building trade. Among its institutions, the university, founded in 1494 by Bishop Elphinstone, takes the lead. It comprises two colleges, King's and Marischal—until 1860, two distinct universities—and with Glasgow sends one representative to Parlia-

ment. Other educational establishments are the Grammar School, the Art Gallery and Art School, and Gordon's College. Most notable amongst the public buildings are the County and Municipal Buildings, the East and West Churches, the Music Hall, the Market Hall, the Trades Hall, Free Church Divinity Hall, Royal Infirmary and Lunatic Asylum. In 1886 was opened the Free Library, which has over 27,000 volumes. At the east end of Union Street—the principal street in the city—is a wide open space where markets are held, and where stands the Market Cross erected 1682. Among the statues are the last Duke of Gordon, Queen Victoria, Prince Albert, and Wallace, and, in the Duthie Park, Gordon Pasha. The city sends two representatives to Parliament. In Old Aberdeen, which adjoins the city on its north side, is situated the Cathedral of St. Machar, dating from 1357, and King's College. North of the old town, again, is the Brig o' Balgownie, the terror of Byron's boyish days. Pop. (1901), 153,497.

Aberdeenshire, maritime county on the E. coast of Scotland, bounded on the N. and E. by the German Ocean, on the S. by the counties of Kincardine and Perth, and on the W. by Inverness-shire and Banffshire. The county is 85 miles long by 42 wide, and is rugged and mountainous in its S.W. parts. Aberdeenshire consists principally of mica-schist, gneiss, and other metamorphic rocks. The rivers include the Dee, the Don, the Ythan, the Bogie, the Urie, the Ugie, the Cruden, and part of the Deveron—all well-known fishing waters. Great numbers of oxen and sheep are annually reared, and the dairy produce is of considerable importance. The other more important industries include granite workings, manufactures of woollen, cotton, linen, sailcloth, and other textile fabrics. Paper-making is extensively carried on; while in the maritime districts the curing of fish employs many hands. The chief towns are Aberdeen, Peterhead, Fraserburgh, Inverurie, Alford, and Ballater. Aberdeenshire returns two members to Parliament. Pop. (1901), 304,439.

Aberdevine. [SISKIN.]

Aberfeldy, a village in Perthshire, situated on the Tay, 32 miles from Perth. The Falls of Moness mentioned in Burns's poem, *The Birks of Aberfeldy*, are in the vicinity. The Black Watch (42nd Highlanders) was embodied here in 1740.

Abergavenny (sometimes pronounced, Abergenny), a market-town in Monmouthshire, 14 miles W. of Monmouth, situated at the junction of the Usk and the Gavenny, and supposed to be the Roman Gobannium. It contains the ruins of a Norman castle and a Benedictine priory, and has a fine stone bridge over the Usk. Its manufactures are shoes and woollen goods, but large coal and iron-works are the chief source of its prosperity. Pop. (1901), 7,795.

Abernethy, JOHN, an eminent surgeon, and grandson of a well-known Irish Nonconformist divine; born in London, 1764. After receiving his early education at Wolverhampton Grammar School, he was apprenticed to Sir Charles Blicke, whom he succeeded (1787) as assistant-surgeon of St. Bartholomew's Hospital. His success as a private lecturer induced the Governors to build a theatre and establish the now famous school of St. Bartholomew's. In 1815 he became principal surgeon; having already (1813) been appointed surgeon to Christ's Hospital, and (1814) Professor of Anatomy and Surgery to the College of Surgeons. His book entitled *Surgical Observations on the Constitutional Origin and Treatment of Local Diseases* was the first attempt to bring surgery and physiology into scientific connection. His teaching was clear and accurate, but dogmatic. Towards his patients he adopted a manner, said to have been foreign to his private life, in which plainness of speech verged on brusquerie and rudeness. He resigned his position at St. Bartholomew's in 1827, and his professorship at the College of Surgeons in 1829; dying at Enfield in 1831.

Aberration, CHROMATIC, an effect observable in simple lenses, due to the different refrangibilities of light of different colours. An object viewed through such a lens will be observed to have coloured edges, the focus for one colour not coinciding with that for another. This defect is remedied by making the lens achromatic. [ACHROMATISM.]

Aberration of light, the name given to the apparent alteration in the true direction of the rays of light from any heavenly body, due to the earth's own motion. Raindrops falling vertically, when viewed from a moving railway carriage, have apparently an oblique motion. The faster the carriage moves, or the slower the raindrops fall, the more oblique will the motion appear. So also with light, the obliquity of the rays of light from any star depending on the velocity of the earth as compared with that of the light itself. Thus a star is never seen in its true position, but always a little distance away in the direction of the earth's motion. The aberration is greatest when the earth's velocity is a maximum, *i.e.* in mid-winter. Thus a knowledge of the earth's speed enables us to determine the velocity of light. [LIGHT.] The phenomenon was discovered by Bradley in 1727, and received full mathematical treatment first by Bessel.

Aberystwith, a seaport, watering-place, and municipal borough on Cardigan Bay in the county of Cardigan, Wales, situated at the confluence of the Ystwith and Rheidol, 244 miles N.W. of London on the Cambrian Railway. Some amount of trade is carried on, the exports being lead, flannel, and iron. The University College of Wales is established here. In the summer many visitors are attracted by the climate, and the picturesque surroundings, among which the Devil's Bridge is not the least interesting. The ruins of a castle of Edward I. crown a promontory to the S.W. Until 1885 Aberystwith was one of the Cardigan parliamentary boroughs. Pop. (1901), 8,013

Abeyance. A freehold or inheritance is said to be in abeyance when it is potentially existent but actually vacant.

Abhorrers, in English history, the name given to the Court party in the reign of Charles II., who, in 1679, expressed in counter-petitions *abhorrence* at the views of those who had presented petitions praying the king to summon Parliament; they considered that the original petitioners or addressers were encroaching on the royal prerogative.

Abigail, the wife of Nabal of Carmel, who refused to shelter David when he was pursued by Saul, for which act he would have been severely punished had not Abigail met the king with a present and a judicious speech. Nabal died a few days later, and David thereupon married Abigail (1 Sam. xxv.). The name has passed into a general appellation for all "handmaids," from the title used by Abigail in her address to David, although some derive the expression from Abigail Hill (Mrs. Masham), attendant on Queen Anne.

Abimelech (Heb. father of the king, or king-father), an official title of Eastern sovereigns, also the name of the son of Gideon who killed his seventy brethren with the exception of Jothan, and made himself King of Shechem, but was himself slain by a stone thrown by a woman at the siege of Thebez (Judges viii. 31).

Abingdon, a market-town in Berkshire, 51 miles N.W. of London, and 6 S. of Oxford, on the right bank of the Thames at its junction with the Ock. The name, originally Abbaddun (Abbots'-town), was derived from the great Benedictine monastery established there, 680. Offa, King of Mercia, built a palace in the town. It possesses two ancient churches and a free grammar-school (founded 1563, rebuilt 1870), and a clothing factory. Up to 1885 it returned a member to Parliament, but is now merged in the division of the county to which it gives its name. Pop. (1901), 6,480.

Abiogenesis, the production of life by the spontaneous generation by dead matter without the intervention of any pre-existing life. It has been contended that the living bacteria that grow in solutions in which meat or other organic matter has been steeped have been thus spontaneously generated. The researches on which this conclusion was based are now discredited, and no satisfactory experimental proof of abiogenesis has been obtained.

Abjuration. The oath of abjuration was imposed in 1701 upon all holders of public offices and members of Parliament, binding them to renunciation of all allegiance to the Stuarts. In 1858 the oath was remodelled, and became a declaration of allegiance to the present Sovereign combined with a promise to support the Protestant succession and a denial of all authority of foreign princes. In 1868 the Promissory Oaths Act enabled Jews and Catholics to substitute a short oath of true allegiance for the old abjuration oath.

Abkhasia, or Abasia, a district on the coast of the Black Sea (lat. 42° 30′ to 44° 45′ N.; long. 37° 3′ to 40° 36′ E.), having the Caucasus to the N. and Mingrelia to S.E. Mountainous, with fertile valleys. Ceded to Russia by Turkey, 1824. The population, owing to emigrations, is inconsiderable. Sukumkaleh is the chief town.

Abner (Heb. father of light), Saul's cousin and commander-in-chief. He quarrelled with Ishbosheth, Saul's son, and transferred his allegiance to David, being warmly welcomed by the king. Soon after this Joab and his brother killed him in the gate of Hebron (2 Sam. iii. 33, 34).

Abolitionists, the name given to that party in the United States which had for its object the total abolition of slavery. Their aims were accomplished, after many years of agitation, when President Lincoln abolished slavery, in 1863. [SLAVERY.]

Abolla, a woollen cloak worn principally by soldiers in ancient Greece and Rome, and opposed to the toga, which was the distinguishing mark of a civilian. At Rome the Stoic philosophers adopted it as a distinctive dress.

Abomey, formerly the capital of Dahomey, West Africa, about 60 miles N. of the chief port, Whydah. A large, straggling, dirty, mud-built town, whose inhabitants carry on a brisk trade in palm-oil, ivory, gold, and slaves. Abomey was the headquarters of the King of Dahomey until 1900, when he was exiled. Here the annual "customs" were celebrated by butchering numbers of prisoners

Aborigines, the earliest known inhabitants of any district. The term was applied, however, by Roman historians specially to an ancient tribe inhabiting Latium; it is now used in its general sense to signify the original occupiers of a country as distinguished from colonists or invaders.

Abortion, the separation and expulsion of the contents of the uterus, occurring prior to the end of the third month of pregnancy. Premature labour is in rare cases artificially induced by accoucheurs where the life of the mother or the fœtus is at stake. The crime of administering any medicine or drug, or using surgical implements, with the intent of procuring miscarriage, in both England and Scotland, is a crime at common law punishable by penal servitude or imprisonment. In the United States it is a felony and punishable by fine and imprisonment.

Aboukir, a coast village in Egypt, 13 miles N.E. of Alexandria, gives its name to the spacious bay stretching E., where Nelson won his famous victory over the French fleet under Brueys in 1798, and where Abercromby's expedition landed in 1801.

About, EDMOND FRANÇOIS VALENTIN, a French novelist, journalist, and dramatist, born at Dieuze (Meurthe), 1828; distinguished himself as a student at the Lycée Charlemagne, the École Normale, and the French School at Athens. His first important work, *La Grèce Contemporaine* (1855), attracted immediate notice; and was followed by a romance in the *Revue des Deux Mondes*, entitled *Tolla*, which brought upon its author a not wholly unmerited charge of plagiarism. In 1856 he tried his hand on the drama; but his

play (*Guillery*), produced at the Théâtre-Français, proved an utter failure. Under the pseudonym "de Quévilly," he replied vigorously to his detractors in the columns of the *Figaro*. It was, however, as a writer of *feuilletons* for the *Moniteur* that he made good his claim to literary distinction. Five brilliant novels—*Les Mariages de Paris*, *Le Roi des Montagnes*, *Germaine*, *Les Échasses de Maître Pierre*, and *Trente et Quarante*, revealed a freshness of style, a delicacy of humour, and a power of description, that at once enlisted public sympathy. In *L'Homme à l'oreille cassée*, which attained great celebrity, he appeared under a new guise. Art-criticism at this period received much of his attention. A visit to Rome resulted in a more serious work, *La Question Romaine*, which, by its anti-papal tendencies, provoked warm discussion, the author keeping up the irritation by a series of articles ("Lettres d'un bon jeune Homme") in the *Opinion Nationale*. Some little success attended *La Risette, ou les Millions de la Mansarde*, a dramatic trifle played at the Gymnase; but in 1862 a more ambitious effort, *Gaëtana*, was driven off the stage of the Odéon by a combination of hostile forces. M. About in the meantime had joined the staff of the *Constitutionnel*. In 1870 he took a somewhat prominent part in public affairs, and was special correspondent of the *Soir*. He ultimately accepted the Republic with something like enthusiasm. He founded and conducted the *XIXme Siècle*, a moderately democratic journal, acting also as correspondent of the *Athenæum*. He died in 1885.

Abracadabra, a construction of letters placed as in the figure adjoining. This figure was copied

A B R A C A D A B R A
A B R A C A D A B R
A B R A C A D A B
A B R A C A D A
A B R A C A D
A B R A C A
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A B R A
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A

on to a scroll and hung round the neck as an amulet, and was supposed to be a preventive against fever and other diseases.

Abraham (Heb. father of a multitude), first named Abram, was the son of Terah, a Shemite, who dwelt first at Ur, in Chaldæa, and afterwards migrated to Haran. Abram married Sarai, his half-sister or niece. At the age of 75 he left Haran with Lot, his nephew, and travelled towards Canaan. He took Hagar as a second wife, and Ishmael was born. Twenty-four years later his name was changed to Abraham, and circumcision was instituted. Sarah then gave birth to Isaac, and Hagar with her son was cast forth. The patriarch lived to the age of 175, and was buried by his two elder sons in the sepulchre of Sarah (Gen. xxv.).

Abraham-man, the name given to that class of sturdy beggar in Shakespeare's days up to the Civil Wars who roamed through England begging and stealing. An Abraham man is described in a work (published 1575) as "one that walketh bare-armed and bare-legged and fayneth himself mad . . . and nameth himself 'poor Tom.'"

Abranchiate animals, those destitute of branchia or gills.

Abrantes, a town in the province of Estremadura, Portugal, situated in a beautiful and fruitful district on the Tagus, about 70 miles N.E. of Lisbon. It is fortified, and commands one of the approaches to the capital. Junot, Napoleon's general, was created Duke of Abrantes.

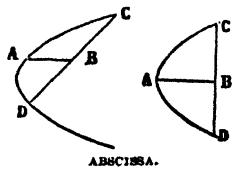
Abrus, a genus of plants belonging to the pea and bean tribe, the most important of which is the tropical *A. precatorius*. The root of this plant yields Indian liquorice, an inferior substitute for the true liquorice of Europe, the product of an allied plant. Its well-known scarlet seeds with a black 'hilum' or scar at one end are known as crab's eyes or jequirity seeds. They are strung into rosaries by Buddhists, whence its name *precatorius*, "relating to prayer," and are stated to have been used as carat weights in weighing diamonds. They contain an alkaloid, jequiritine, stated to be antagonistic to atropine, and are consequently employed in ophthalmia, etc.

Abruzzi and Molise, a district of Italy, extending along the coast of the Adriatic, and constituting formerly one province of the kingdom of the two Sicilies. It was later subdivided into three—Abruzzo Ulteriore I., Abruzzo Ulteriore II., and Abruzzo Citeriore, but now forms one compartimento, comprising the provinces of Chieti, Teramo, Aquila, and Campobasso, and having an area of 6,380 sq. miles. The country, being traversed by the Apennines, is rugged and wild, but the valleys are productive, and the uplands provide pasture for large numbers of sheep.

Absalom (Heb. father of peace), the handsome and beloved son of David, by Maacah, daughter of Talmai. His ambition led him to form a party, and to organise an armed rebellion against his father, who fled beyond Jordan. A battle ensued in the forest of Ephraim, the conspirators were utterly defeated, and Joab, finding Absalom caught in a tree near Mahanaim, killed him (2 Sam. xviii.).

Abscess, a collection of pus or matter in the tissues of the body. Abscesses are classified as acute, and chronic or cold. They must be regarded as the result of disease rather than a disease in themselves, *e.g.* the alveolar abscess or "gumboil" which occurs in dental caries (q.v.), or the abscesses which are so frequently met with in the strumous joint disease of children. The surgeon detects the presence of matter by the sense of "fluctuation" which it yields to his examining fingers. The early evacuation of the contents of an abscess cavity is in many cases a matter of great importance.

Abscissa, a term used in geometry to designate the length of a line (A B) drawn from a fixed point (A) in a fixed direction to any given line (C D) on a curve (C A D). It was formerly applied only to the conic sections.



ABSCISSA.

Absentee, a term especially used with reference to those landlords who leave the management of their estates entirely in the hands of agents, and rarely visit and never settle in the country from which they obtain their income. In Ireland much of the discontent and disturbance has been attributed thereto. Beyond the obvious disadvantage of leaving the estate to the management of an agent, the system further entails the spending of much money out of the country from which it is obtained and the diminution of the feeling of responsibility on the part of the landlord.

Absinth, a strong spirituous liquor flavoured with wormwood and other plants containing the principle known as *absinthin*. It is made chiefly in Switzerland, and is consumed in France and America. The drinking of absinth is carried to great excess, and has markedly deleterious effects, sometimes leading to insanity or paralysis.

Absolution, a term generally used in the sense of remission of sins, although it was at one time a term in Roman law. There has been some difference in the forms of absolution as administered at different times, which may be classed as the precatory or optative, and the declaratory or indicative absolution. The latter is much more authoritative than the former; at first the formula in use was *Deus* or *Christus absolvit te;* later, however, this was changed to *ego absolvo te.* Absolution as used in *ecclesiastical law* signifies the release of the individual from church censures and from all penalties belonging to them. In the English Church service absolution is always precatory, except in the case of the Service for Visitation of the Sick, when it is indicative—the priest using the words, "By His authority committed to me, I absolve thee from all thy sins."

Absolvitor. That decree in Scottish law which ends a case in favour of the defendant.

Abstract, as opposed to *concrete*, the state of viewing any particular properties of an object apart from its other properties. Abstract in *law* signifies the summary of a book or document: it has an especial meaning with reference to summaries or epitomes of the evidences of ownership, when it is known as abstract of title. A perfect abstract shows that the owner has both the legal and equitable estates at his own disposal without any encumbrance. Abstracts of title are used to enable any purchaser to judge of any encumbrances affecting the title before purchasing.

Absurdum, REDUCTIO AD, an indirect method of proving a proposition by showing that its incorrectness would lead to an absurdity. Euclid frequently uses it in his geometrical demonstrations.

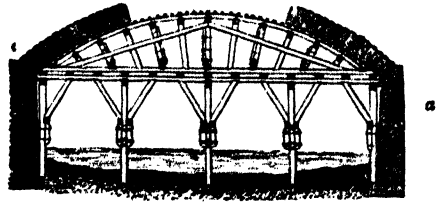
Abu, the sacred mountain of the Jain sect (q.v.), is in Sirohi one of the Rajputana states, and has a height of some 6,000 feet. On the top stands a block of granite bearing the footprints of Vishnu, and half-way up are two magnificent marble temples, the finest specimens extant of Jain architecture. The place is used by Europeans as a sanatorium.

Abu-Klea, THE WELLS OF, situated in the Bayuda Desert, Nubia, not far from the Nile at Metemneh. Here an engagement took place Jan. 17, 1885, between a column about 1,600 strong, under Sir Herbert Stewart, detached from the main body of Lord Wolseley's expeditionary force at Korti, and an outpost of the Mahdi's army, resulting in the defeat of the latter.

Abul-Faraj, GREGOR, known as Abulfaragius and Barhebraas, an Armenian Jew, born 1226, and educated as a physician. He settled in Tripoli, and became first Bishop of Guba (1246), afterwards of Aleppo. His *History of the World* contains valuable information as to the Saracens, the Tartar Mongols, and the conquests of Genghis-Khan. He died at Maragha in 1266.

Abul-Feda, ISMAEL BEN-ALI, EMAD-EDDIN, an Arabian prince; distinguished as a warrior and a man of letters; born at Damascus, 1273, being of Saladin's family. He fought against the Crusaders, and later against the Tartars and Bibacs. He inherited the princedom of Hamah, 1298, but was not established there firmly till 1311. His *Universal History* and *Geography* are the most important records extant of Arabian affairs during the period preceding his own. He died in 1331.

Abutment, a term used in architecture to denote the solid part of a wall, pier, or mound



ABUTMENTS (a a) OF A BRIDGE.

against which an arch rests. The abutments of a bridge are the supports of its two extremities.

Abydos, a town situated on the Hellespont, in the province of Mysia, Asia Minor, nearly opposite to Sestos on the European side. It played an important part in Greek history, for it was the point from which Xerxes crossed on his bridge of boats; and it offered a stubborn resistance to Philip II. of Macedon. The story of Hero and Leander has

rendered it still more famous. The old Turkish castle of the Dardanelles lies a little S.

Of the same name is the town in Upper Egypt, famed for its riches in specimens of Egyptological sculptures. It was at Abydos that the two famous temples of Seti I. and Rameses II. (the Pharaoh of the Captivity) were situated, and which have yielded such valuable information as a result of the explorations of Prof. Flinders Petrie.

Abyssinia, the name of which is derived from the Arabic word Habesh, a mixture, in reference to the mixed population, is a mountainous country of E. Africa, lying between 7° 30′ and 15° 40′ N. lat. and 35° and 40° 30′ E. long. It is bordered on the N. and N.W. by Nubia, on the E. by the African possessions of Italy, on the S. by the territory of the Gallas, on the W. by the regions of the Upper Nile. The area is about 350,000 square miles, and the population between three and four millions. Abyssinia consists of a series of extensive tablelands, the average height being 7,000 feet, intersected by deep valleys hollowed out by the action of water, and by precipitous mountain ranges, the chief of which are the Samen (15,000 feet), the Lamalmon, and the Lasta. The slope is abrupt towards the Red Sea, more gradual towards the valley of the Nile.

The principal rivers are tributaries of the Nile. The Mareb, the most northerly, rises in the mountains of Taranta, and after a course of over 500 miles loses itself in the sand, though in the rainy season it reaches the Atbara. The Takazza or Atbara rises in the Lasta mountains, and after a course of about 800 miles flows into the Nile. The Abai, Bahr-el-Azrek, or Blue Nile, rises in two mountains near Geesh, 10,000 feet above the sea-level, passes through Lake Tsana, and then after enclosing the province of Godjam in a semicircular curve, flows northwards till it joins the White Nile at Khartoum. The Hawash rises in the province of Shoa, and flows N.E. to Lake Abhelbad. The largest lake is the Tsana, 60 miles by 40.

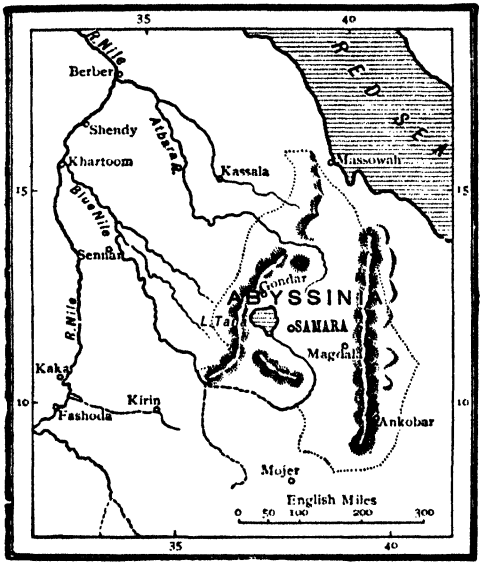
In general the climate is pleasant and healthy. The soil is rich and fertile, three crops being grown in the year in some parts. Maize, wheat, barley, peas, beans, and *taff* and *tocussa*, two kinds of grain used locally for bread, are cultivated, as are also the date, orange, banana, pomegranate, lemon, vine, sugar cane, cotton, coffee, and indigo.

The cattle are small and humped, the sheep fat-tailed and woolly, the horses strong and active, and there are numerous goats. The spotted hyæna is the most destructive of the animals, but the elephant, rhinoceros, lion, and many other wild beasts are found. Eagles, vultures, hawks, and other birds of prey, partridges, pigeons, parrots, and thrushes are plentiful.

In Abyssinia there are three distinct ethnical elements: 1. The aboriginal *Negro*, on the northern and western slopes. 2. The *Hamitic*, aboriginal, on the plateaux (Agau, Dembea, Falasha, Klamants) and recent intruders in the south and south-east (Gallas). 3. The *Semitic* (Himyaritic branch), intruders from south-west Arabia, and throughout the historic period constituting the dominant political race. Of the Semites there are two branches—the *Tigré* in the north-east, and the *Amharic* in all the other provinces. Originally both spoke a Himyaritic language, the Ghéz, which about the fourteenth century became differentiated into the two neo-Himyaritic languages, Tigriña and Amhariña, the former slightly, the latter profoundly modified by Hamitic words and grammatical forms. Ghéz is still studied as the language of the liturgy, while Amhariña has become the language of the court, of diplomacy, and general intercourse. All these languages are written in a peculiar syllabic alphabet resembling that of the Himyaritic inscriptions in Yemen; but none possess a literature in the strict sense of the term. Like their speech, the Semites themselves have become largely blended with the surrounding Hamitic populations. But as both Semites and Hamites belong to the Caucasic stock, the modern Abyssinian type is remarkably regular, though the normal complexion is a yellowish-brown, with a great variety of shades, from the almost light colour of the nobles to the dark brown and even black of the lower classes. The people are Christians of the Monophysite sect; the National Church being a branch of the Coptic, and its spiritual head, the Abuna, always a Copt consecrated by the Patriarch of Alexandria; but the Falashas, *i.e.* "Exiles," practise Jewish observances, and have even been regarded as Jews, or as the "Lost tribes of Israel." Socially the Abyssinians are more civilised than the neighbouring Gallas and Somalis, but fall far below the European standard. They may be described as in the "barbaric" state, the natural evolution of their social system having been arrested by the interruption of their intercourse with the Byzantine empire, caused by the sudden irruption of Islam into the Nile valley in the seventh century. The industrial arts are little developed. The Abyssinians, who call themselves "Ithiopiavian," *i.e.* "Ethiopians," in the elevated style, and "Habêshi" in familiar language, are a light-hearted, intelligent people, but vainglorious and of coarse habits. Their feasts of raw flesh, as described by Bruce, are still in use; polygamy is prevalent, and the marriage tie easily severed. Education was entirely in the hands of the clergy until 1907, when the Emperor issued an edict enjoining compulsory education, provided by the State, of all male children over the age of 12.

ABYSSINIAN (*Tigré Branch*).

The four chief provinces are Tigré in the N., Amhara in the centre, containing the capital Gondar, Godjam in the S.W., and Shoa in the S.E. Abyssinia was known in the time of the Ptolemys,



OUTLINE MAP OF ABYSSINIA.

and in the fourth century Christianity was introduced. In the sixth century the greatest height of prosperity was reached, but the Mohammedan conquests of the seventh century drove the Abyssinians back into their tableland. Legends of Prester John were from the fourteenth century onwards identified with the King or Negus of Abyssinia, and in the fifteenth century the Portuguese reached the country in search of him. They tried to introduce the Roman Catholic faith, but though the Royal family accepted it for a short time in the seventeenth century, the bulk of the people remained unchanged. Theodore began to extend his power, and in 1855 was crowned king by the Abuna. In consequence of a fancied insult he imprisoned the British Consul, Captain Cameron, together with all the other Europeans in his dominions, and refused to negotiate with the embassy sent in 1864. A British expedition of 16,000 men of all arms was sent out under the late Lord Napier of Magdala. In 1868 the fortress of Magdala was stormed, and Theodore was found dead. On the departure of the British troops a struggle for supremacy ensued among the native chieftains, but in 1872 Prince Kassai of Tigré was crowned under the name of John. In 1885 Italy annexed Massowah and virtually the whole coast. King John protested, and in 1887 an engagement took place between the Italians and Abyssinians, in which all but ninety of the former were killed. King John, however, was killed by the Dervishes in 1889. Thereupon Menelek became king, and accepted the protectorate of Italy. He repudiated this in 1893, and the Italians abandoned the claim after their defeat at Adowa in 1896. An agreement was concluded in 1906 between Great Britain, France, and Italy to preserve the political and territorial *status quo* of Abyssinia. Early in 1910 it was persistently reported, with much circumstance, that Menelik was dead, but later it was officially contradicted by the *Times*.

Acacia, a genus of shrubs and trees belonging to the sub-order *Mimoseæ* of the natural order *Leguminosæ*, including about 420 species, natives of tropical and sub-tropical countries. The leaves are generally bi-pinnate and the flowers small and in rounded clusters; but in some, especially among Australian kinds, leaf-stalks or *phyllodes*, flattened in a vertical plane, take the place of leaves. In some species, as in *A. spherocephala*, the bull's-horn thorn, of Nicaragua, the spinous stipules are hollow and are inhabited by ants. Acacias yield gum: *Acacia Senegal* the best Gum Arabic, Picked Turkey, White Senaar or Gum Senegal. The best quality is imported from Kordofan. *Acacia stenocarpa* and *Seyal*, believed to be the shittimwood of Scripture, yield Suakim or Talca Gum; *Acacia arabica*, Babul or East Indian Gum Arabic, coming from Africa, but shipped at Aden to Bombay and thence to England; *Acacia horrida*, Cape Gum; and *Acacia gummifera*, Morocco, Mogador or Brown Barbary Gum. The Australian species, known as wattles, *Acacia pycnantha*, Golden Wattle, *A. dealbata*, and *retinodes*, Silver Wattle and *A. decurrens*, Black or Green Wattle,

ACACIA CATECHU (*showing Leaf, Flower, and Fruit*).

yield Wattle Gum, and their astringent bark, known as Mimosa or Wattle Bark, or an extract from it, is largely imported for tanning. The astringent medicine known as Catechu or Cutch is obtained by boiling down the wood, especially that of *A. Catechu*. Several Australian species produce fine dense timber, especially *A. melanoxylon*, Blackwood,

and *A. homalophylla*, Myall, the latter being fragrant and used, therefore, for tobacco-pipes. The name acacia is popularly applied to the North American *Robinia Pseudacacia*, the Locust-tree, a large tree with pinnate leaves and pendulous racemes of white pea-like blossoms, planted as an ornamental tree in Europe.

Academy, in foreign countries an institution for the promotion of one or more of the arts and sciences, corresponding to such English societies as the British Association, the Royal Society, the Statistical Society, etc. The first academy is said to have been founded by Ptolemy Soter at Alexandria, and the collections of books and art treasures formed by the members were the origin of the famous Alexandrian library. Academies for various purposes existed during the Middle Ages, and the revived interest in learning and literature at the time of the Renaissance led to the establishment of many, especially in Italy. The famous *French Academy* was founded in 1635 by Richelieu, and from the beginning may be said to have taken the French language under its charge, whether for good or for evil is a much vexed point. It has now developed into the *Institute of France*, subdivided into five sections, each of which is called an "academy." The *Imperial Academy of Sciences* at St. Petersburg is almost equally well-known and is justly celebrated for its contributions to the knowledge of the vast Russian Empire, and of Oriental religions, languages, and customs. It is obviously impossible to attempt to give a list of the academies of science, literature, history, the fine arts, archæology, medicine, and surgery which exist in every civilised country, but mention should be made of the *Royal Academy of Arts* in London, founded in 1768, with Sir Joshua Reynolds as the first president. It is a self-governing, self-supporting body, maintaining a school of art in which education is given free to all who can pass the necessary examinations, and opening an exhibition of the works of living artists every summer, and of the "old masters" every winter.

The term academy is also applied to a place where the arts and sciences are taught, and though in England the word in this sense has been degraded to the use of second- and third-rate schools, in Scotland and elsewhere some of the best educational establishments are called academies. It may also mean an institution for training in some special art, as a riding or dancing academy, and with this meaning the military college for training officers at Woolwich is called the *Royal Military Academy*.

The word itself is derived from the name of a garden near Athens, the original possessor of which was said to have been Academus, a contemporary of Theseus. The Greek philosopher Plato taught his disciples there for nearly fifty years, and hence they were styled the Academics, and the system of philosophy the Academic.

Acadia, or **Acadie,** the name given to the French colony in North America founded by De Monts (1604), but subsequently seized by the English, and by royal patent (1621) named Nova Scotia.

Acalephæ. [Jelly Fish.]

Acantharia, an order of Radiolaria, including those whose skeletons are composed of acanthin, a horny substance allied to chitin (q.v.).

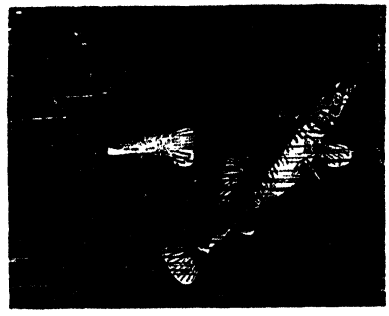
Acanthocephala, a class of worms, parasitic in crustacea or insects in one stage, and in fish, birds, or mammals in another; they are mouthless but have a proboscis armed with teeth, by which they are attached to the intestine of the host. The only genus is *Echinorhynchus*.

Acanthocladida, a family of Bryozoa found in the Carboniferous and Permian periods.

Acanthoglossus. [Echidna.]

Acanthology, the study of the structure, etc., of spines, more especially of those of sea urchins.

Acanthopterygii, an order of Teleostean fishes, distinguished by the presence of unjointed spines in the dorsal, anal, and ventral fins, and the generally separate condition of the lower pharyngeal bones. The order has nineteen divisions, and contains some of the commonest fishes, as the perch, stickleback, sea-bream, mackerel, mullets,



Stickleback—Acanthopterygian.

gobies, etc. The fossil species of the order are mainly Tertiary, but it has some representatives in the Chalk.

Acanthotelson, a Carboniferous Crustacean, either an Amphipod or Schizopod.

Acanthoteuthis, the oldest known "devil fish" (*Octopus*). It is found in the Solenhofen lithographic stone.

Acanthus, a genus of herbaceous plants belonging to the natural order *Acanthaceæ*, natives of South Europe. The large, handsome, deeply-cut, spinous leaves of the commonest species, *A. mollis*, Bear's-breech, are supposed to have suggested the capital of the Corinthian column.

Acanthus
(*Corinthian Capital from the Pantheon*).

Acapulco, a town on the Pacific coast of Mexico, 190 miles S.S.W. of the capital,

was formerly the seat of Spanish trade with the East. It is still important as a station for mail steamers; exporting wool, skins, cocoa, etc., and importing piece-goods and hardware.

Acarina, an order of ARACHNIDA, including a large number of small forms, in which the body is not marked off into two distinct regions by a transverse constriction. Respiration is usually effected by tracheæ, minute tubes ramifying through the body and opening to the exterior. Many are parasitic. It includes the "water bear," cheese and water mites, ticks, etc.

Acarnania, now Carnia, a province of ancient Greece lying between Ætolia and the Ionian sea; a rugged country, populated by shepherds of Epirot race who in olden times served the Athenians as slingers. Chief town, Stratos, afterwards Leucas.

Acarus. [ACARINA.]

Accadians, a pre-Semitic cultured people of the lower Euphrates, whose empire was overthrown by the Assyrians between 1700 and 2000 B.C. Their language was agglutinative, and supposed to belong to the Ural-Altaic family; it is preserved in the oldest cuneiform writings. [ASSYRIA and BABYLONIA.]

Acceleration, in *kinematics*, or science of motion, the rate of change of velocity of a body. That which produces it is termed a force (q.v.), and relates to dynamics. If a body, starting from rest, is subject to a constant acceleration, its velocity at any instant is proportional to the time it has been in motion, and to its acceleration. Change of direction implies change of velocity (q.v.), and therefore implies an acceleration. Hence a body moving along any curve has an acceleration, though it move with constant speed.

Accent, the marking of a certain syllable or syllables in a word with special intonation of the voice. In a word of more than three syllables, and in some of three syllables, there is more than one accent, while in words of two syllables only one accent is used. The modern tendency of pronunciation is to throw the accent as far back as possible. *In music* it signifies an emphasis occurring at regular intervals of time. Generally the accent occurs on the first note of the bar.

Accentor, a genus of Warblers, with 12 species from Europe and Asia, one of which, *A. modularis*, the Hedge Accentor, or Hedge Sparrow (q.v.), is British, and another, *A. alpinus*, the Alpine Accentor, an occasional visitant. The latter may be distinguished from the hedge sparrow by the throat, which is white spotted with black, and the wing-coverts, which are reddish-brown, varied with black, and tipped with white.

Acceptance, the final act in the completion of a Bill of Exchange, and it consists in the person on whom the bill is drawn writing the word "accepted" across the same and adding his signature. Such acceptance may be either absolute, conditional, or partial. Absolute acceptance is a contract to pay the bill strictly according to its tenour. Conditional acceptance is a promise to pay on a contingency occurring, as for example on the sale of certain goods consigned by the drawer to the acceptor. Partial acceptance is a promise to pay only part of the sum mentioned in the bill, or to pay at a different time or place from those specified. In all cases the acceptor must sign by himself, or by some person duly authorised by him. Acceptance has also a distinct legal signification in Scotland. There a contract usually commences with an offer, and is afterwards completed by acceptance; the offer is conditional on acceptance, but may before acceptance be recalled. In the United States the law on the subject of "acceptance" is nearly the same as in England. [BILL OF EXCHANGE.]

Accession, *legally*, a mode of acquiring property in things that have a close connection with each other; thus the owner of the cow becomes likewise the owner of the calf, and a landowner becomes proprietor of what is added to his estate by alluvion (q.v.). Accession produced by the art or industry of man is termed industrial accession, as when wine is made out of grapes. In Scotch bankrupt law, when there is a settlement by trust deed it is accepted by each creditor by a deed of accession. In United States law accession is the right to all the production of one's own property, the right to that which is united to it, naturally or artificially by accretion. Where a chattel is sold or pledged, and such sale or pledge is accompanied by delivery and afterwards other materials are added by the labour of the vendor or pledger, these pass by accession.

Accessory, or Accessary, a person guilty of a felonious offence, not as principal but by participation, as by advice, command, aid, or concealment. In treason there are no accessories, every person concerned (being considered and treated as a principal. In crimes below felony also, all persons concerned, if guilty at all, are regarded as principals. Accessories are of two sorts—*before the fact* and *after* it. An accessory *before the fact* is punishable to the same extent as the principal, and there is now indeed no practical difference between them. Accessories *after the fact* are punishable with imprisonment not exceeding two years. In Scotland no distinction is made between actual commission of crime and accession thereto. In the United States there is absolutely no difference between accessories and principals.

Accidentals, in music, those signs which occur in a composition to denote the temporary raising or lowering of a note.

Accipitres. [AËTOMORPHÆ.]

Acclimatisation, strictly, the gradual adaptation of plants or animals to climates differing from those they have originally endured and at first injurious to them. The term is often confounded with domestication, the cultivation, that is, of foreign species that need not even be hardy: and with naturalisation, the running wild of a hardy exotic species that may have come from a similar climate and not have required any adaptation. Acclimatisation may be brought about in the lifetime of an individual by its gradual transfer or by

the physiological effects of the climate; but this can probably seldom effect much. It is more likely to succeed by transporting a considerable number of healthy adult individuals to some intermediate station and breeding from them, with careful selection of their hardiest offspring. Little has as yet been done in this direction. There are a good many Acclimatisation Societies in existence, of which perhaps the best known is the Paris *Société d'Acclimatation.*

Accommodation Bill. Where some person joins in a note or bill without receiving value, and to enable another person to raise money, he is said to take an "accommodation bill." [BILL OF EXCHANGE.]

Accommodation of the Eye, the mechanism by which the images of objects at varying distances are brought to a focus on the retina. Helmholtz has demonstrated that this is effected by the contraction of the ciliary muscle, which, by influencing the tension of the suspensory ligament of the lens, admits of alteration in the convexity of the anterior lens' surface. [PRESBYOPIA.] In the theory of vision, it is that power which the normal eye possesses of adjusting itself to see objects at different distances. The distance from the lens in the eye to the retina is practically constant. Hence, if the eye were incapable of accommodation, only objects at one definite distance would produce clear images on the retina. But the curvature of the crystalline lens in the normal eye may be so varied by muscular alteration of its anterior surface that objects may be clearly seen at all distances beyond five or six inches. The range of vision is said to extend from six inches to infinity; thus a star may be seen as clearly as one of these letters. With old age the accommodating power diminishes, and the eye has to be assisted by the use of spectacles. This defect is, however, quite distinct from that of long-sightedness, in which case the *range* is abnormal, though the accommodation for that range may be perfect.

Accompaniment, in music, any part or parts which are subordinate to the melody and which are added to complete or enrich the harmony. Accompaniment may be either vocal or instrumental.

Accordion, a musical instrument, which is in reality a simpler and earlier form of the concertina; it is of very limited capacity, and is now merely used as a plaything for children.

Account, in its legal signification, a statement shewing an amount or balance due by one party to another for sums paid, goods supplied, or services rendered. A balance agreed and settled between the parties is termed an "account stated." In bankruptcy the failure of a tradesman to keep proper accounts of his business is a criminal offence. Corporations and officers of the Court are generally required to publish periodical accounts; life assurance companies are necessitated under the Act, 1870, to make very elaborate returns and accounts; building societies are also required to do the same with the registrar annually.

Accountant, "one whose profession it is to understand book-keeping and accounts of all kinds in theory and practice." The principal work devolving upon him is: (1) To audit books of account in order to secure correctness and detect fraud; (2) to prepare balance-sheets and any other returns and statistics of trade; (3) to administer insolvent estates of companies and private debtors, and adjust the rights and liabilities of partners and creditors; (4) to investigate and arbitrate upon business disputes. Since 1880 the profession has been governed by the "Institute of Chartered Accountants in England and Wales." Scotland also possesses three Chartered Institutes in Edinburgh, Aberdeen, and Glasgow.

Accrah, a town in W. Africa, under British jurisdiction, about 75 miles N.E. from Cape Coast Castle. It is now the seat of government in the Gold Coast Settlement.

Accrington, municipal borough and manufacturing and market town, 4 miles E. of Blackburn. The large church of St. James dates from 1554; it was restored in 1763. The town hall, erected in 1857, is in Italian style. Adjoining it is a market hall. The Mechanics' Institution is in Italian style, and contains reading-rooms, class-rooms, library, and large laboratory for students in chemistry. The trade consists chiefly in cotton-spinning and weaving, and in printing cotton fabrics; the manufacture of mechanical appliances used in the cotton mills is also carried on, and there are collieries, quarries, and breweries. Pop. (1901), 43,095.

Accumulation. In addition to its various meanings, this term has the following special signification. An Act of Parliament popularly known as "The Thelluson Act" (it having been enacted to counteract dispositions similar to those under which as those made by a Mr. Thelluson tying up the enjoyment of his property for an almost illimitable period of time), prohibits the selling or disposing of property by deed, will, or otherwise, so as to *accumulate* the income for any longer term than the life or lives of the settlor or settlors and 21 years after. The Act relaxes this principle in certain cases of minority and of provision for payment of debts and portions.

Accumulator, *in hydraulics*, a contrivance for storing up energy in the form of water at high pressure. The applications of hydraulic power are now very extensive, many machines being very conveniently worked by water. It is, however, wanted at very great pressures. To obtain this continuously the accumulator is used. It is simply a heavily-loaded hydraulic press. Water is forced into it by pumping-engines, and gradually lifts the ram. The water now within the press, having to support the full load on the ram, is at great pressure, and may be drawn off to the different hydraulic machines. *In electricity.* [SECONDARY BATTERIES.]

Aceldama ("Field of blood"), the name given to the field which was purchased by the priests with the money given back by Judas after his repentance (Matt. xxvii. 8.)

ACEROSE LEAVES (*Juniper-tree*).

Acephala, [PELECYPODA.]

Acerose, a term applied to the apex of a leaf when sharp-pointed or needle-like, as in the Juniper

Acerra, a town in Campania, destroyed by Hannibal for its loyalty to the Romans, but afterwards rebuilt (Livy, xxiii. 17; xxvii. 3).

Acervularia, a genus of Rugose corals of interest, as some of the species (as *A. ananas*) almost certainly belong to existing families. [RUGOSA.]

Acetic Acid, $HC_2H_3O_2$ (= $CH_3.CO.OH$), the acid principle of vinegar. It is produced in nature by the fermentation of alcoholic liquids, and its formation in this way accompanies the growth of a fungus, *Mycoderma aceti*, to the activity of which, as a carrier of oxygen, its development is due. In countries where alcohol is cheap, acetic acid is manufactured by this process of fermentation. In England it is mainly obtained by the dry distillation of wood. The crude acid obtained by the latter method is termed *Pyroligneous Acid*, and requires purification from tar and wood spirit. Pure acetic acid, as obtained from pyroligneous acid and vinegar, by processes of refinement, is a colourless liquid which congeals below 16°C., and is hence called *Glacial Acetic Acid*, B.P. 118°C.; $S.G._{\frac{0}{4}}^{20}$ = 1·05. It can be mixed in all proportions with water, alcohol, and ether; and forms salts called *Acetates*, which, for the most part, crystallise well and are very soluble in water. Acetic acid, as usually sold, is a mixture of pure acid and water; as defined by the British Pharmacopœia, it contains about 33 per cent. of the glacial acid. It is used in medicine to relieve nervous headaches and fainting fits, and in manufactures for calico printing, and the preparation of acetates.

Acetone, C_3H_6O (= $CH_3CO\,CH_3$), or *Di-methyl-Ketone*, the first of a series of organic compounds known as the *Ketones*. [KETONE.] It is usually prepared by the dry distillation of acetates, but may also be obtained by the destructive distillation of many organic substances, and is one of the by-products in the manufacture of acetic acid from wood. Acetone is a colourless, limpid, and very inflammable liquid, which mixes in all proportion with water, alcohol and ether, and is a solvent for camphor, fats, and resins, B.P. 56°C.; $S.G._{\frac{0}{4}}$ = ·81.

Acetylene, C_2H_2 (= CH.CH), or *Ethine*, a gaseous substance of disagreeable odour, which is produced by the incomplete combustion of hydrocarbons; the well-known smell of a Bunsen burner which has been turned low and "lit back" is due to formation of acetylene. It was discovered by Berthelot in 1859, by discharging an electric current between carbon points, in an atmosphere of hydrogen, and forms the starting-point in his celebrated synthesis of alcohol. [ALCOHOL.] Acetylene may be liquefied at ordinary temperatures by a pressure of about 80 atmospheres; it forms a characteristic compound with copper, known as *Copper-acetylene*, a substance which is precipitated as a red and somewhat explosive powder by passing the gas into an ammoniacal solution of a cupric salt.

Achætæ, those GEPHYREANS, or spoon worms, not provided with bristles; it includes the commonest members of that class, such as the *Sipunculidæ*.

Achaia, the ancient name of a country in the Peloponnesus, lying along the S. coast of the Corinthian Gulf, also called Ægialea. It was peopled by the Achaians, who originally came from Thessaly and conquered the greater part of the Peloponnesus; but on the return of the Heraclidæ they were driven to the N. coast. There the name spread very widely; and about 280 B.C. was formed a confederacy, which embraced twelve cities, known as the Achaian League. Under Aratus and Philopœmen this remarkable organisation kept alive the traditions of independence, and afforded a model of federal government. When the Romans conquered Greece, they gave the name of Achaia to the southern portion of the country, formerly known as the Peloponnesus. With Macedonia it constituted the whole of Greece, and consequently the phrase Macedonia and Achaia came to be used as an equivalent for the ancient Greece. It now forms, together with Elis, a province which occupies much the same situation as the ancient Achaia.

Achard, LOUIS AMÉDÉE EUGÈNE, a French novelist, born at Marseilles, 1814. After a few years spent in business in Algeria, and in official life in the provinces, he went to Paris (1838) and entered upon the profession of journalism. Under the pseudonyms of "Grimm" and "Alceste," he contributed literary articles to the *Époque* and the *Assemblée Nationale*. Later on he plunged into politics, and in 1848 took an active part as an officer of the Garde Nationale against the insurgents, his brother being killed by his side. In 1850 he was severely wounded in a duel with M. Fiorentino. He was war correspondent of the *Moniteur* in 1870, and was present at several engagements. His death took place in 1875. Amongst the numerous works on which M. Achard's fame rests, the best known are *Chateaux en Espagne*, *La Robe de Nessus*, *Belle-Rose*, *Maurice de Treuil*, *Les Séductions*, *Les Fourches Caudines*, and *Marcelle*. Several of his dramatic productions have been successful.

Achates, the faithful friend of Æneas (*Fidus Achates*, *Æneid* i. 188, etc). The name has become generally used as an equivalent for a faithful friend.

Achelous, a river of Epirus, which, rising in the Pindus range, and flowing between Ætolia and Acarnania, empties itself into the Ionian Sea, where its silt forms a group of small islands known as the Æchinades. Its name, celebrated by many poets, from Hesiod downwards, became almost a synonym for water.

Achene, or Achænium (from the Greek, meaning "not splitting"), an indehiscent, superior, dry, one-chambered, and one-seeded fruit or carpel,

The fruit of the buttercup is a collection (etærio) of achenes, and that of the strawberry only differs in the fleshy mass supporting the achenes.

Acheron, a river of Epirus flowing through L. Acherusia into the Ionian Sea. Either from the supposed origin of its name (*achos*, woe) or from local legends, it became confused or identified with one of the rivers of the infernal regions.

Acheta, a genus of ORTHOPTERA, one species of which, *A. domestica*, the house cricket, is more widely known than appreciated. Its structure agrees closely with that of the cockroach, to which reference should be made.

Acheul, St., Type. [FLINT IMPLEMENTS.]

Achievement, in heraldry, a complete representation of a shield with all its quarterings and accessories; it is generally used of a funeral escutcheon when it is intended to show the rank and family of the deceased gentleman.

Achill, an island off the W. coast of Ireland, in county Mayo, from which it is separated by Achill Sound. It is 16 miles long by 7 broad, and has a coast-line of 80 miles. Between it and a smaller island (Achillbeg) lies Achill Sound, a deep and safe haven. Achill Head, 2,222 ft. high, is the name of its S.W. promontory, that on the N. being called Saddle Head. The W. coast is steep, rocky, and dangerous: but on the E. the approaches are easy and sheltered, the sea being fordable at low water. The soil consists of rock and bog, and but little of it can be cultivated. Amethysts are found here, and there is a valuable bed of limestone.

Achilles, the son of Peleus (Pelides), and grandson of Æacus (Æacides). His mother, Thetis, a daughter of the sea-god, Nereus, dipped her son in the Styx, which rendered his body invulnerable, except the heel by which he was held (ACHILLES TENDON). He was educated by the Centaur, Chiron, and became king of the myrmidons of Phthiotis in Thessaly. To escape the fate predicted for him in the Trojan expedition, he assumed a girl's dress, and hid himself at the court of Lycomedes of Scyros when the other warriors were setting forth (Hor. *Od.* I. viii. 13). Ulysses, however, by an artful stratagem, penetrated his disguise, and he joined the invading host. Early in the war he was compelled to give up to Agamemnon the captive maid Briseis, and the quarrel that thereupon ensued protracted the siege of Troy, and provided a theme for Homer's Iliad, of which Achilles may be regarded as the hero. He sulked in his tent till his friend Patroclus was slain. Then the desire for vengeance prevailed; he buckled on the new armour made for him by Vulcan, and Hector speedily fell before his spear. The epithet most frequently applied to him by Homer is *podōkys*, "swift-footed." Homer refers to the death of Achilles, but we learn from legendary sources only that he was shot in the heel by Paris whilst celebrating his nuptials with Polyxena, daughter of Priam. Telamonian Ajax and Ulysses contended for his armour, which the Greeks awarded to the latter. His son was named Pyrrhus, or Neoptolemus.

Achilles, TENDON OF (*Tendo Achillis*), the largest and strongest tendon of the human body, by means of which the calf muscles are attached to the heel. This tendon is occasionally divided, for the relief of certain malformations. [TENOTOMY.]

TENDON OF ACHILLES.

Achimenes, a large genus of dicotyledonous herbaceous plants belonging to the order *Gesneraceæ*, natives of Central America, cultivated in our stoves and greenhouses for their large showy mono-symmetrically salver-shaped flowers.

Achromatism of Lenses, a device usually obtained by the use of compound lenses, to remedy the effects of chromatic aberration. A combination of lenses made of different kinds of glass, and of definite focal lengths, will enable us to unite as many coloured images as there are lenses. For ordinary purposes it is only necessary to combine two of the more intense colours, such as the orange-yellow and the green-blue. This is done with crown and flint-glass lenses. It has been discovered recently that single lenses, if manufactured of carefully-prepared glass, may be made achromatic. Blair achieved the same result a century ago by the use of fluid lenses.

Aciculidæ, a family of air-breathing Gasteropods, the mouths of whose shells are closed by opercula. They are confined to the Tertiary era.

Acid, the term anciently given to sour liquids, denotes, in the more restricted acceptation of modern chemistry, a *Salt of Hydrogen*, which is capable of exchanging the whole, or part, of the hydrogen it contains for a metal. The usual method of effecting this exchange is to act upon a metallic oxide with a solution of the acid. Acids, which, in such a process as this, can part with no less than the whole of their hydrogen, are called *Monobasic acids*, and can form only one salt. (Ex. *Hydrochloric Acid*, HCl; Acetic Acid, $CH_3CO.OH$.) Acids which can part with their hydrogen in two halves are capable of forming two salts, and are hence called *Dibasic*. (Ex. Sulphuric Acid, H_2SO_4; Oxalic Acid, $H_2C_2O_4$.) The definition of a *Tribasic* acid is precisely similar. (Ex. Phosphoric Acid, H_3PO_4; Citric Acid, $H_3C_6H_5O_7$.) Acids are sometimes classified as *inorganic* and *organic*: the former are extremely powerful and corrosive, and do not, on this account, exist normally in nature. *Sulphuric*, *nitric*, and *hydrochloric* are the principal inorganic acids. *Organic acids* are produced by the activity of living tissue in plants and animals; they frequently occur in the free state. (Ex. *Citric Acid* in lemons.) *Acetic*, *oxalic* and *tartaric* are important acids of this class. Solubility in water, sourness, the power of reddening blue litmus paper, also of effervescing with alkaline carbonates, and of

neutralising and being neutralised by alkalis; all these are characteristic properties of acids, although not necessarily essential.

Acidaspidæ, a family of TRILOBITES found in the Silurian and Devonian rocks.

Acidimetry, a branch of chemical analysis, which occupies itself with the determination of the strength of acids. Acidimetry is usually performed in the *volumetric* manner, but is sometimes effected by *weight-analysis*.

Acinetaria. [TENTACULIFERA.]

Acis, a Sicilian shepherd, who fell in love with the nymph Galatea, a daughter of Nereus. He had a formidable rival in the Cyclops Polyphemus, who crushed him with a rock, and his blood gave its name to a stream that flows from Mount Etna. The story has been musically treated by Händel in his famous cantata, *Acis and Galatea*.

Aclinic Line, or *Magnetic Equator*, the name given to the irregular curved line drawn in maps round the earth, indicating the points at which the magnetic needle remains horizontal, without dipping.

Acne, a form of skin disease, the result of inflammation in and around the *sebaceous* or fat-secreting glands. Reddish pimples of the size of a pin's head or somewhat larger present themselves, usually on the face and on the back between the shoulder blades, never on the palms or soles. The disease particularly affects young adults, and causes, while it lasts, considerable disfigurement. Comedones (*v.* COMEDO) are not uncommonly present between the acne pimples. The basis of all treatment is cleanliness, in conjunction with which sulphur lotions prove of service. *Acne rosacea* is an affection quite distinct from ordinary acne, consisting in chronic congestion of the skin of the nose and adjoining parts of the face. One form of this disease, more common in men than women, is generally supposed to be produced by excessive drinking; this is, however, by no means always the case.

Acœmetæ, the name given to those monks in the fifth century who divided their communities into three relays, so that worship might be carried on unceasingly.

Acolyte, the highest of the four Minor Orders in the Roman Church; a cleric in such order. The special functions of acolytes are to carry the lights, minister the wine and water, and attend on the celebrant at mass. These duties are now generally performed by lay men or boys, to whom the name is loosely applied.

Aconcagua, the name of a province, river, and peak in Chili, South America. The valley watered by the Aconcagua is one of the most fertile in that region; and the mountain, non-volcanic, that looks down upon it is about 23,000 feet high. San Felipe, formerly called Aconcagua, the capital, lies at the foot of the Andes, about 60 miles N.N.E. from Valparaiso, and is a prosperous, well-built town.

Aconite or Monk's-hood, a genus of more than 60 species of herbaceous plants, belonging to the order *Ranunculaceæ*, natives of the mountains of the northern hemisphere. Many kinds are grown for their flowers, which have a large hood-like sepal, blue or yellow, arched over two stalked honey-secreting tubular petals. The dark tapering roots contain the alkaloid *aconitine* ($C_{30}H_{47}NO_7$), a white, uncrystallisable, bitter, acrid substance, which renders them virulently poisonous. They act as an irritant and narcotic. The powerful Bikh poison of Nepaul used for arrows is prepared from *Aconitum ferox*, which is now preferred as a source of aconitine to the common European species, *A. Napellus*. The latter is a doubtful native of England. Its roots have been mistaken for the pale-yellow Horse-radish.

3 1 2

ACONITE.
1. *Flower.* 2. *Leaf and buds.* 3. *Root.*

Aconitine, the active principle of Aconite, is a most active poison. It is used medicinally in the form of the Aconite Ointment for external application to painful surfaces. Internally, aconite is administered mainly in the form of the tincture, a powerful drug, in the use of which much caution is necessary.

Acorn, the corn or fruit of the oak (Anglo-Saxon *æc*), formed of three coherent carpels with an adherent perianth-tube, which terminates in a point and becomes horny. Its three chambers and their six ovules are aborted to one chamber with generally but one seed. The acorn is surrounded at the base by a cup or cupule. The bitterness of the seed varies both in species and in individuals, the acorns of several kinds of evergreen oak being still used as human food in the Mediterranean region. Swine, deer and goats, squirrels, pigeons, and other animals feed largely upon acorns.

Acornshells. [BALANIDÆ.]

Acorus, a small genus of plants of the Aroid family, of which *Acorus Calamus*, the Sweet Sedge, is commonly naturalised in Europe. The starchy underground stem, or rhizome, of this plant contains a fragrant oil, said to be tonic and stimulant and of use in ague and dyspepsia. It is used for hair-powder, as a candy, in aromatic vinegar, in herb-beers, gin and snuff, and for chewing to clear the voice. It was formerly cultivated in Norfolk, but is now imported from South Russia.

Acosta, CHRISTOVAL, a Portuguese naturalist and physician, who visited the East Indies, and especially Goa, in the 16th century, to seek for drugs and plants, on which he wrote a treatise. He died in 1580 at Burgos, in Spain.

Acosta, JOAQUIM (*d.* 1852), a distinguished geographer and historian in the military service first of Columbia and afterwards of New Granada. In 1834 he began a series of explorations, which have

added much to our knowledge of South America. In 1848 he published a valuable compendium on the discovery and colonisation of New Granada, and in 1849 he re-edited the works of Caldas, a learned antiquarian often quoted by Humboldt.

Acotyledons, a name somewhat inaptly applied to the cryptogamic portion of the vegetable kingdom by analogy with the divisions Dicotyledons and Monocotyledons, comprising all flowerless plants. It signifies that their spores or reproductive elements do not contain any cotyledon or embryonic leaf. Though this is strictly true, as they do not at first contain even an embryo, in the higher Cryptogams such as the Ferns an embryo is subsequently produced, one portion of which gives rise to a cotyledon, much as in Monocotyledons.

Acouchy. [AGOUTI.]

Acoustics, the science relating to those effects called sounds, their causes and transmission, qualities and analysis. Drawing a bow across a violin-string causes it to vibrate. A certain effect is produced on the ear, an effect varying with different ears, or at different distances with the same ear. This effect is transmitted from the string to the tympanum or drum of the ear by a vibratory motion of the particles of the air, or other elastic medium, which may intervene. Without an elastic medium to transmit this effect no sound would be heard. Thus a bell ringing inside the exhausted receiver of an air-pump cannot be heard. The velocity of transmission depends on the nature of the medium, varying with its elasticity and with its density. If the elasticity be increased the velocity will increase; if the density be increased the velocity will decrease. The rate at which sound travels in the air is 1,093 feet per second at 0° C., increasing about 2 feet per second for every degree Centigrade. The velocity of sound in liquids is as a rule much greater than in gases, and much greater in solids than in liquids, the elasticity increasing more rapidly than the density. Thus in water the velocity is 5,000 feet per second, and in iron 16,000 feet per second. The chief laws of acoustics are thus stated:—(*a*) The intensity or loudness of a sound varies inversely as the square of the distance of the sonorous body from the ear. If the distance is doubled the intensity is diminished to ¼. (*b*) The intensity increases with the amplitude or extent of vibration of the sonorous body; (*c*) it diminishes if the density of the medium is diminished, and (*d*) it is strengthened by the neighbourhood of other sonorous bodies. Hence the use of sounding-boxes in stringed instruments, and of sounding-boards for the voice. Sounds vary in pitch or acuteness if the frequency of the vibration varies; thus, if the number of vibrations per second be increased we obtain a higher note, if diminished we have a lower. If the number be doubled a note is heard that produces a certain physiological effect of sameness. This note is the octave, or first harmonic. If trebled we get the second harmonic, and so on. The limits of hearing of the ordinary human ear are from about 34 (Helmholtz) to 34,000 vibrations per second, but the range varies considerably with different individuals. 261 vibrations per second are recognised by our musical sense, as . A tuning-fork used on a sounding-board gives us a nearly pure note such as this, but as a rule we never get simple notes corresponding to definite frequencies of vibration. Thus in sounding C on a pianoforte it is easy to recognise some of the harmonics, especially when the keys of the harmonic notes are kept down. This admixture of other notes to the fundamental gives us the quality or timbre of a sound, and we are thus enabled to distinguish between the voices of different people or the sounds of different instruments. [MUSICAL INSTRUMENTS.] Like other wave motions, sound waves may be reflected or refracted; they may augment each other or they may interfere. [REFLECTION, REFRACTION, INTERFERENCE.]

Acraspeda, a sub-class of HYDROZOA, including the majority of the large permanently unattached jelly-fish. The main characteristic, from which the name is derived, is the absence of a velum. The body consists of a bell-shaped disc, in which the polypite is suspended; the structure may be compared to an open umbrella, with a very short handle. In the craspedote jelly-fish a velum or shelf runs round the umbrella, a little above the base, and limiting the opening; this is absent in the *Acraspedæ*. The most interesting feature in this group is its development. The life history is divided into three stages, excluding the embryonic. After the free-swimming ovum has become fixed, it develops into a small hydra-like body, the *Scyphistoma* (this stage is not known in many forms). By a series of constrictions this tube becomes transversely divided, and then resembles a pile of saucers with ragged edges; this is the *Strobila stage*. The constrictions deepen and successive segments are cut off; these swim away as *Ephyræ*, each of which develops into the adult form, which is sometimes of a gigantic size. The four bodies on the margin of the disc, which serve as sensory organs, are covered by hoods. The group is, therefore, often known as the "covered-eyed Medusæ." *Aurelia*, one of the commonest of the larger jelly-fish round the British coasts, serves as a good type of the class. [AURELIA.]

Acre, a measure of land, consisting of 4,840 square yards or 10 square chains, or 4 roods. The measure of an acre in the United States is the same as the English acre, but the old Scotch and Irish acres were somewhat larger.

Acre, ST. JEAN D'ACRE, or Accho, probably founded by Phœnicians, and known to the later Greeks as Ptolemais, is a fortified sea-port in Syria, situated on a projecting tongue of land that forms the N.E. limit of the Bay of Acre, the promontory of Mount Carmel being to the S.W. It was captured by the first crusaders, 1104, and again by Baldwin, 1110. Saladin retook it, 1187, but Richard Cœur de Leon and Philip Augustus won it back, 1191, and gave it to the Knights of St. John. In 1291 it again

passed into Saracen hands, and gradually fell into decay. Towards the end of the 18th century Ahmed Djezzar, Pasha of Sidon, improved and fortified the place, and in 1799, with the help of Sir Sydney Smith, held it successfully against the French under Bonaparte. Ibrahim Pasha besieged it in 1832, and scarcely left a house standing. Another bombardment by the English and Austrian fleets under Sir R. Stopford occurred in 1840, when a magazine blew up that swept away two Egyptian regiments and completed the destruction of the town. Its great trade has melted away, and now solid fragments of masonry alone bear witness to its former strength and prosperity.

Acridiidæ. [GRASSHOPPERS.]

Acroceraunian Mountains, a range of mountains in Epirus ending with a bold promontory beyond Oricum, much dreaded by sailors —*infames scopulos Acroceraunia.* The name is, perhaps, derived from the exposure of these high peaks to lightning. In modern times the headland is called C. Linguetta.

Acrogens, or Summit-growers, a name applied to the higher cryptogamic plants, viz. mosses, ferns, horse-tails, and lycopods, in which there are a distinct stem and leaves, the former increasing most notably in length by growth at its apex. The vascular bundles are in a ring, and like the indefinite ones of Monocotyledons, closed, so that the stem increases little in diameter, whilst its apical growth results mainly from the repeated division of one large apical cell.

Acrolein, C_3H_4O (= $CH_2.CH.CHO$), or *Acrylic Aldehyde*, a characteristic product of the destructive distillation of fats, being produced by the decomposition of *Glycerin*. It is usually prepared by heating pure Glycerin in a retort with *Phosphoric Acid* or *Acid Potassium Sulphate*, and condensing the product in a receiver surrounded by a freezing mixture. Acrolein thus obtained is a volatile, limpid, and very refractive liquid, fairly soluble in water; much more readily soluble in ether, B.P. 52° C.; S.G. $\frac{20}{4}$ = ·84. Its vapour is excessively irritating to the nose and eyes, and it is very difficult to keep for any length of time even in closed vessels, as it changes spontaneously into an insoluble substance, called *Disacryl*, which is probably a polymeride. By exposure to air or by treatment with silver solution it is oxidised to *Acrylic Acid* ($C_3H_4O_2$).

Acropetal, a hybrid term, partly of Greek, partly of Latin derivation, in botany signifies developed in succession from base to apex. It is essentially identical with "centripetal," but is usually applied rather to elongated structures, as, for instance, the secondary rootlets originating from a tap-root or the leaves unfolding along a shoot. Structures which are not acropetal are termed adventitious.

Acropolis, the common Greek name for all fortified citadels. In ancient Greece the most notable of these citadels were those at Corinth, Thebes, Argos, and Messene; but the term is especially used of the rocky eminence that crowns the city of Athens. This is a square, craggy mass, with steep sides, about 150 feet high; the flat summit has a length of 1,000 feet and a breadth of 500. The view from this eminence is naturally very commanding, and now affords an admirable opportunity to the visitor of realising the relative positions of the historical landmarks of Athens. After the Persian war it was uninhabited, and dedicated solely to the worship of Athena. A splendid flight of marble steps led up from the Agora to the Propylæa, or porch of the enclosure. This noble structure of pure Pentelic marble consisted of a grand central entrance decorated with massive Doric columns and two side galleries, that to the left being the Pinakotheka, or museum of pictures. The temple of Nike Apteros faced the W. front. On passing through the gateway the Parthenon immediately met the eye. It also was of Pentelic marble and in the Doric style. The building, 228 feet in length, 101 feet in breadth, and 66 feet high to the top of the pediment, displayed 50 majestic columns, enclosing a cella that contained two chambers of unequal size. The metopes within and the friezes without were sculptured in high and low relief respectively, and the whole building was full of sculptures and statues, all executed under the direction of Phidias, who himself carved the marvellous colossal statue of Athena. This magnificent figure, 40 feet in height, was of ivory where the flesh was represented, and the drapery was of solid gold. It was probably tinted. A still larger effigy of the virgin goddess in bronze stood in front of the Parthenon, and towered above it so as to serve as a landmark to ships at sea. Another glory of this sacred spot was the Erechtheum, where Poseidon was worshipped. Its date is later than that of the Parthenon, and its style Ionic. Here sprang up the primeval olive tree at the bidding of Athena, and here could be seen the imprint of Poseidon's trident on the rock. In a hollow beneath the Acropolis lay the cave of Pan.

Acrosalenia, an extinct genus of sea-urchin in which a series of additional plates is present in the apical-disc. The genus is confined to the Jurassic and Cretaceous systems. [APICAL-DISC.]

Acrostic, a series of lines or words so arranged that their initial letters taken in order form a word or a name. The practice of making acrostics was at one time much in use, but at the present day they are composed mainly as puzzles.

Act has several distinct meanings: (1) a document in writing declared to be the act and deed of the party signing; (2) an act of bankruptcy, being any act which subjects a person to be proceeded against under the bankrupt law; (3) an act of God, being any event not brought about by human means or which human means could not have avoided. In such cases (apart from special contract) no one is entitled to redress or damages from another. In insurance, an act of God is an

exception to the insurer's liability. [ACT OF PARLIAMENT.]

Act of Congress. [CONGRESS.]

Act of Parliament, the name given to a Bill (q.v.) after it has passed successfully through both Houses of Parliament and has obtained the Royal Assent. It is then absolutely binding.

Act of Settlement, an Act passed in 1700, by which all prior claims to the throne, excepting that of the issue of William or of Anne, were set aside in favour of Princess Sophia, Electress of Hanover, and the heirs of her body; by this Act George I., her son, succeeded to the crown on the death of Anne. In 1652 Cromwell's measure for the settlement of Ireland, also known as the Act of Settlement, was passed; it is this settlement that Mr. Lecky regards as "the foundation of the aversion between the proprietary and the tenants, which is the chief cause of the political and social evils of Ireland."

Act of Toleration, an Act passed in 1689 relaxing the severe provisions against Protestant Dissenters contained in the Act of Uniformity (q.v.), the Five-mile Act (q.v.), and the Conventicle Act.

Act of Uniformity (1662), the name given to that statute by which all ministers were required to give their assent to the Book of Common Prayer, and to read the morning and evening services from it. In consequence of this Act 2,000 clergymen resigned their livings. The Act of the same name passed in 1559 was directed against any persons who made use of any other form of prayer-book than Edward VI.'s Revised Prayer-book.

Actæon, son of Aristæus, the child of Apollo, and Autonoë, daughter of Cadmus. He was a mighty hunter, and came upon Diana bathing in a woodland stream. To punish him for his intrusion the goddess transformed him into a stag, and he was devoured by his own hounds.

Actæonidæ, a family of GASTEROPODA which has existed since the Carboniferous period.

Actinia, one of the commonest genera of the sea anemones, which affords a good type

ACTINIA.

of the structure of that group. *A. equina*, "the Beadlet," is one of the commonest British species; it occurs attached to rocks, stones, and even crabs, all round the coast. It consists of a fleshy cylinder one to four inches in diameter and one inch in height. Its firm adherence to the object on which it lives is secured by its flat base, the disc; in the centre of the upper end of the cylinder is the mouth surrounded by rings of tentacles. The mouth leads to a short digestive tube, the stomodæum; this is open below to the body cavity and is held in position by radiating membranes, the mesenteries; upon these are the reproductive organs. Its only method of defence is the shooting out of minute barbed threads. *Actinia* should be compared with ALCYONIUM, from which it differs mainly in that the mesenteries occur in multiples of six instead of eight and that the tentacles are not fringed.

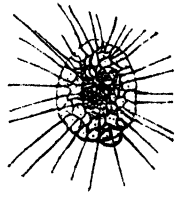
Actiniaria, the order of ANTHOZOA, which includes the sea anemones. *Actinia*, which has been described, is a fairly typical representative of the group. The principal variations are that some are not attached, but free-swimming, as MINYAS, or burrowing in mud, as PEACHIA; in some the mesenteries are eight (EDWARDSIA) or in multiples of eight (PARACTINIÆ), though they usually conform to the hexameral (six-rayed) arrangement of the ANTHOZOA.

Actinism, that property of certain kinds of light which produces chemical action, as distinct from their heating or light-giving powers. Thus, of the constituent rays of the sun's light the actinic rays are those at and beyond the violet end of the visible spectrum, those rays at the other end producing no apparent chemical effect. If the actinic rays be screened off by a piece of ruby-glass, which prevents the passage of any rays but the red, no chemical effects will be produced. Hence the use of ruby-glass lanterns in photography.

Actinocrinus, one of the best known genera of Crinoids of the Palæozoic era; it is common in the carboniferous limestone of the North and West of England. [CRINOIDEA.]

Actinomere, one of the divisions of the body of the CTENOPHORA. [PLEUROBRACHIA.]

Actinomycosis, a disease characterised by the formation of tumour-like growths, occurring in the tongue and lower jaw of cows, but not unknown in the human subject. It is caused by the actinomyces or ray-fungus, the exact botanical status of which is not yet clearly decided.



ACTINOPHRYS SOL. (*Magnified.*)

Actinophrys, a common genus of HELIOZOA. It occurs in both fresh and salt water. *A. sol*, the "sun animalcule," is the best known species, and its ordinary size, including its radiating pseudopodia, is about $\frac{1}{100}$ inch in diameter. [HELIOZOA.]

Actinotrocha, the larva of PHORONIS. It is greatly expanded anteriorly, and surrounded by a ring of long cilia at each extremity; the whole body is covered by shorter cilia.

Actinozoa, a synonym of anthozoa (q.v.).

Action (*Legal*). The proceedings taken at law by any one to enforce his rights against another. All proceedings of a civil nature are designated actions, but the Chancery Division of the High Court of Justice is the proper tribunal to resort to for relief of an equitable nature, such as the specific performance of contracts, matters of trust, etc. in Scotland there is no formal distinction between law and equity, indicated above, and which has from almost the earliest time prevailed in England. Ordinary costs of an action usually follow the event, although the judges have now a larger discretion in such matters than formerly.

Action (*Physical*). The action of one body on another, as understood by Newton in his third law of motion, is simply the force that the one impresses on the other. This law is that action and reaction are equal and opposite, or that the mutual actions of any two bodies are always equal and oppositely directed. Thus, if one body presses another, it is also pressed with the same force in the opposite direction; if one body exerts an attractive force on another, it also is attracted with an equal force.

Actium, a promontory in Acarnania, at the entrace to the Ambracian Gulf. Here stood a famous temple of Apollo, and the coast was dreaded by sailors. The spot is famous for the sea-fight, in which Augustus defeated Antony, B.C. 31. To commemorate his victory, Augustus instituted quinquennial games called Actia, and founded Nicopolis, on the opposite shore of the straits.

Acton ("oak-town"), the name of many small towns and villages in England, and also of a suburb of London, on the Oxford road, where during recent years a large population has sprung up.

Acts of Sederunt, statutes made by the Lords of Session, sitting in judgment, by which the forms of procedure for administering justice are determined; in 1540 the Scottish Parliament conferred upon the judges the powers embodied in this Act.

Acts of the Apostles, the fifth book of the New Testament, dealing with the work of Paul, Peter, and the leading Apostles. It is said by some to have been written by the Evangelist Luke. It is the subject of much controversy between theologians, some maintaining its absolute historial accuracy, while others affirm that it was written with the view of reconciling two hostile factions within the church. It has, however, always been admitted by the authorities into the Canon of the New Testament.

Aculeata, the division of *Hymenoptera*, in which the ovipositor is converted into a sting. ANTS, WASPS, HORNETS, and BEES are the principal representatives of the group.

Acupressure, a method of checking hæmorrhage by means of a needle thrust into the tissues in such a way as to press upon and occlude the bleeding vessel.

Acupuncture or puncture with a needle, method of treatment at one time in considerab vogue, now but rarely made use of. In cases chronic rheumatism and neuralgia it is still occ sionally adopted. In sciatica, for example, a ste needle is sometimes passed into the back of t thigh, right down to the bone, and there left f two or three hours. The relief afforded is occ sionally considerable, and, if carefully performe the operation is a simple and comparatively pai less one. Obviously, however, it is not to be light undertaken, and, in particular, an intimate a quaintance with anatomy is necessary for its sa execution. Acupuncture has now fallen into son disrepute, largely on account of the extent which quackery has been associated with it.

Adagio, in music, one of the slowest indicatio of time measures, and ranks with *largo* and *grav* the name is applied to a movement or section of piece as well as to the measure of its time, as t Adagio in F, etc.

Adalbert, a German ecclesiastic, born 101 and raised by the favour of the Emperor Henry II (1043) to the Archbishopric of Bremen and Ham burg, which included all Scandinavia. He accon panied his patron to Rome, and is said to hav refused the tiara. His efforts to raise Bremen t the position of an independent patriarchate riva ling Rome were frustrated by the death of t Emperor and the influence of Cardinal Hildebran As one of Henry IV.'s guardians, he endeavoure to win him over to his designs, but was unsuccessfu After three years' banishment he was restored t office, 1069, and died at Goslar, 1072.

Adam (Heb. *man* or *ruddy*), the first ma The story of his creation will be found in the fir three chapters of Genesis, told, perhaps, by tw different hands, and bearing many points of r semblance to the primitive legends of India, Persi Greece, and other countries. The temptation Eve by the Serpent, and of Adam by Eve; the si of eating the forbidden fruit of the tree of knov ledge; their expulsion from Eden, and the curs upon their posterity, have given rise to mult tudinous discussions, according as the words the Bible are taken in their literal sense or e plained on a figurative or allegorical hypothesi Adam and Eve had several sons and daughter Cain, Abel, and Seth being the eldest. The da of the Creation was assigned by chronologers the old school to the year 4004 B.C., and Scriptu states that Adam lived 930 years. Amongst man strange legends collected in the Talmud, one the best known is that which makes Lilith (q.v. the mother of demons, Adam's first wife.

Adam, ADOLPHE CHARLES, a well-know French musician, was born in 1803, and died in 185 He wrote, among numerous other works, the oper entitled *Le Châlet* and *Le Postillon de Lonjumeau*

Adam, ALEXANDER, a Scotch schoolmast and educational writer of some note, was bo in 1741, and died in 1809. His most valuab books were *The Principles of Latin and Engli*

rammar, Roman Antiquities, A Summary of History and Geography, and a Latin dictionary.

Adam, ROBERT, an eminent architect, born at dinburgh in 1728, and in 1762 appointed architect George III. In conjunction with his brother ames (whence the name of Adelphi [*brothers*] orne by one of their enterprises), he filled rge quarters of London with buildings in the lassi-classical style—for the most part uninteresting, but not devoid of light and space. Fair specimens of his taste and skill will be found in ortland Place and Caen Wood House, and his ame survives in Adam Street, Strand. He sat for any years as M.P. for Kinross, and died in 1792.

Adam, THE RIGHT HON. WILLIAM, a lawyer nd politician, born in Scotland in 1751. He ntered Parliament in 1774, fought a duel with ox in 1779, but remained the close friend and ly of that statesman in his struggle against the ppression of public liberty. He had a conderable practice at the Bar, and was one of the anagers of the Warren Hastings trial. In 1806 he as for a brief period Chancellor of the Duchy of ancaster. From 1815 to 1830 he presided over ne Scotch Jury Court for trying civil causes, and ied in 1839.

Adamawa, a country of vague extent in entral Africa, lying half way between Lake Chad nd the Bight of Biafra, and watered by two tributaries of the Niger—viz. the Benuwe and the Faro. he soil is very rich, and there is abundance of urra, yams, ground-nuts, bananas, and cotton. lephants are plentiful, and ivory forms an important export. Yolla, the capital, stands between ne two rivers. Slavery prevails, and the government is in Mohammedan hands, the Sultan of okoto being the nominal suzerain.

Adamite, the name adopted by a religious ect in the second century, who sought to revive ne state of man before the Fall, and therefore bjected marriage and worshipped without clothes. he sect had some devotees in the 12th and 15th enturies.

Adamnan, or Adomnan, a native of Ireland, ho flourished about 624 to 704, and was Abbot f Iona during the last twenty-five years of his fe. He tried in vain to induce his monks to dopt the observance of Easter according to the oman Calendar, and he wrote two curious books: *Life of St. Columba*, and a treatise, *De Situ Terræ anctæ*.

Adams, CHARLES FRANCIS, son of John Quincy dams, born 1807, graduated at Harvard, and dmitted to the bar 1828. After long experience n the local legislature of Massachusetts, during hich as a Free-Soiler he supported Van Buren, he ntered Congress on the Republican ticket in 1858. n 1861 he was appointed Minister to England, and eld that post with dignity and credit during the ritical period of the Civil War and the discussion f the Alabama claims. Retiring in 1868, he served s arbitrator under the Washington Treaty in 1871. He aspired to the Presidency, but met with insufficient support. He was, however, elected Governor of his native State, and wrote much in reviews and magazines. He died in 1880.

Adams, JOHN, one of the founders of the United States, was born in Massachusetts in 1736. He was educated at Harvard, and entered the office of Putnam to study law. Rapidly rising in his profession he very soon forecast the future destiny of the Colonies, and in 1765 joined in protesting against the Stamp Act. Yet he defended Capt. Preston and his soldiers from a charge of murder in 1770. He was a member of the first Congress of 1774, and was sent in 1777 with Franklin and others as Commissioner to France. Two years later he was employed to negotiate for peace, and to make a commercial treaty with England. He maintained a firm attitude in face of French opposition to these aims, and succeeded in bringing Holland into friendly relations with the New Republic, which in 1785 he represented at the Court of St. James's. Before returning to America in 1787 he wrote a *Defence of the American Constitution*, strongly contending for the co-existence of two chambers. A little later he combated the propagandism of French revolutionaries in a book entitled *Discourses on Davila*. He succeeded Washington as President in 1797. At the expiration of his office he made way for Jefferson, being unable to deal satisfactorily with the pretensions of the French demagogues. He felt, however, no jealousy towards his successor, whose policy he cordially approved. Living in retirement at his native place, Braintree (Quincy), he reached the venerable age of eighty-nine. His death took place in 1825.

Adams, JOHN QUINCY, eldest son of the preceding, and born at Braintree, 1767, spent much of his earlier years in Europe. He graduated at Harvard, was called to the bar, wrote with ability in a Boston newspaper, and was sent by Washington as ambassador to the Hague, 1794. Thence he went to Prussia, but being recalled, 1801, entered Congress as a Federalist in 1803. Breaking with his party, he retired to practise the law, and lecture on literature at Harvard until 1809, when, after denouncing a Federalist plot for separating New England from the Union, he went as ambassador first to St. Petersburgh and then to London, assisting in framing the Treaty of Ghent, 1814. In 1818 he became Secretary of State, and in 1825 was chosen President. Whilst in office he adopted Protectionist views, and also endeavoured to purchase Cuba. Jackson defeated his re-election, and for two years he lived in retirement, but returning to Congress in 1831 he by his exertions paved the way for the Abolition of Slavery. He was seized with paralysis in the midst of a debate (1848) and died two days later.

Adams, SAMUEL, born at Boston, U.S.A., 1722, being second cousin to John Adams. Owing to his father's failure in business he went through severe struggles in youth, becoming ultimately tax-collector for Boston. He very soon threw himself into the struggle against the British Government;

was a member of the Philadelphia Congress, and signed the Declaration of Independence. As President of the Massachusetts Senate, Lieut.-Governor, and Governor of the State, he held office till 1797. He attached himself to the Republicans under Jefferson, and withdrew from public life when the Federalists got the upper hand, dying in 1803. Napoleon's famous reproach—"The English are a nation of shopkeepers," is traced to one of Adams's speeches.

Adam's Apple, the name given to the protuberance in the fore part of the throat, caused by the thyroid cartilages of the larynx; the name has arisen from the legend that a piece of the forbidden fruit stuck in Adam's throat. The name is also applied to some fruits.

Adam's Bridge, the name given on legendary grounds to a series of sand-banks connecting Ceylon with India.

Adam's Peak, a conical peak, about 7,000 ft. high, in the S. of Ceylon, 45 miles E.S.E. of Colombo. Mohammedans and Buddhists regard the spot with equal veneration, for at the summit of the mountain, within a small wooden temple,

ADAM'S PEAK.

is a depression in the ground, 5½ ft. by 2½ ft., which the former assert to be the footprint of Adam, whilst the latter are no less confident that it was made by Buddha as he stepped over to Siam. The shadow cast by Adam's Peak at sunrise is one of the most extraordinary sights in the world.

Adana, a province and capital city, in Asia Minor. The latter is on the right bank of the Sihun, 30 miles from the sea, and occupies the site of Antiochia ad Sarum. Commanding the route over the ranges north of Syria, it was seized by Ibrahim Pacha in the revolt of 1832 and held until 1840. The fine bridge over the river is attributed to Justinian. The surrounding plain is rich in agricultural produce.

Adanson, Michel (1727–1806), a distinguished French naturalist, of Scottish Jacobite ancestry, was born at Aix, in Provence, 7th April, 1727. He was educated at Plessis; Needham first gave him a microscope, and he studied under Bernard de Jussieu at the Jardin des Plantes. Having obtained an appointment in Senegal in 1748, he remained there until 1754, mapping the country, making astronomical and meteorological observations, studying the languages, and forming immense collections, part of which he described in 1757 in his *Histoire Naturelle du Sénégal*. This work contains the first sketch of his system of classification, applied to molluscs. In 1763 he applied it, in his *Familles des Plantes*, to the vegetable kingdom, and in an immense unpublished work, offered in 1774 to the Academy of Sciences, of which he had been elected a member in 1759, he applied it to all three kingdoms of nature. His system consists in drawing up a number of artificial classifications—classifications based, that is, on one set of characters—and finally placing together those species which came together in the greatest number of classifications. He thus distinguished 58 families of plants, and prepared the way for Jussieu's natural system. Reduced to poverty, he received a small pension, and died. August 3rd, 1806. The Baobab was named *Adansonia* by Linnæus in his honour.

Adaptation. [EVOLUTION.]

Adda, anc. ADDUA, a river of North Italy, rising from a confluence of streams in the Rhætian Alps and flowing through the Valtellina into the north end of Lake Como. Thence it issues at Lecco, and traversing the plain of Lombardy unites with the Po 8 miles above Cremona. It formerly separated Venice from the Milanese, and has played an important part in military history. Lodi, the scene of the Austrian defeat in 1796, is on its banks.

Addax, a genus of Antelopes with one species (*A. nasomaculatus*), popularly called the Addax, ranging over North Africa, North Arabia, and Syria. In size and make it resembles a large ass; colour, reddish-brown above, grayish white beneath, a broad band of white on the face; hoofs large and spreading; horns expanding outwards in two turns of a wide spiral and annulated nearly to the top, present in both sexes.

Adder, an alternative name for the Viper (q.v.). The word is also used with an epithet to denote some of Viperidæ, as the Berg Adder (*Vipera atropos*) and the Puff Adder (*V. arietans*) of South Africa, and the Death Adder (*Acanthophis tortor*) of Australia, all of which are extremely venomous.

Adder-beads, called also *Serpent stones* and *Druidical beads*, large beads of glass or vitreous paste, and amber, occurring, usually singly, in prehistoric British sepulchral cists or urns. This fact would seem to show that they were not regarded as personal ornaments, but rather as amulets, and as such were deposited with the ashes of the dead. The source whence these beads were derived has long been a subject of dispute, but they probably came from the South or South-east of Europe. The same folk-lore has grown up concerning these as is prevalent with regard to Snake-stones (q.v.).

Adder-pike. [WEEVER.]

Adder-stones, the translation of the Gaelic *thnathrach*, the folk name for prehistoric ne spindle-whorls. [SNAKE-STONES, SPINDLE-IORL.] The name is also applied to Adder-ads (q.v.).

Addington, HENRY, VISCOUNT SIDMOUTH, of Lord Chatham's medical adviser, born at ading 1757. After being educated at Winchester d Oxford, he was called to the bar, but imme-ately entered Parliament (1784) as M.P. for vizes. "The Doctor" was one of Pitt's intim-es, and in 1789 was elected Speaker, in which pacity for twelve years he displayed tact and gnity. In 1801, when Pitt went out of office ing to the king's obduracy as to Catholic Eman-pation, Addington came in at the head of "the ng's Friends," and concluded the short-lived ace of Amiens. The combination of Pitt and x, to urge on Parliament more adequate plans for tional defence, ousted the Cabinet of Courtiers 1804, but Addington returned next year as Presi-nt of the Council, with a peerage. In 1805 his titude towards Lord Melville compelled him once ore to resign, but on Pitt's death he came back r a year as Privy Seal and Lord President. In 12 he resumed the latter post under Perceval, but on exchanged it for the Home Office, which he ld for ten years in Lord Liverpool's ministry. displayed his courage, consistency, and ill-dged loyalty in one continuous effort to suppress e liberties of the people, and to him the "Man-ester or Peterloo Massacre" of 1819 was largely e. From 1822 to 1824 he sat in the Cabinet thout a portfolio, and then retiring into private e he attained the venerable age of 87, dying Feb. , 1844.

Addison, JOSEPH, the eldest son of the Rev. urence Addison, afterwards Dean of Lichfield, rn at his father's rectory of Milston in Wiltshire, the 1st of May, 1672. He went to school Amesbury, Salisbury, and the Charterhouse; 1687 he entered Queen's College, Oxford, two ars later he was elected to a demyship at Magda-n College, he became M.A. in 1693, and fellow of s college in 1698. Little is known of his Oxford e, except that he showed there the shyness which, a certain extent, always clouded the calm, sweet rength and loveableness of his character. A walk ider the elms by the Cherwell is still called by s name. In 1693 he addressed a short poem to ryden, who received it very favourably. His her work of this period is an *Account of the reatest English Poets*, an address to King illiam, classical translations for Tonson the ookseller, and Latin verses in the *Musæ nglicanæ*. In 1699 Somers and Charles Mon-gue, afterwards Lord Halifax, obtained for m a travelling pension of £300 a year, in order at he might qualify himself for the service of e State. Addison visited France, Italy, Ger-any, and Holland. He composed the *Epistle om Italy* while crossing Mont Cenis, and also rote while abroad the first four acts of *Cato*, and e *Dialogue on Medals*. His pension stopped in 1702 with the fall of the Whigs, and he returned to London in 1703 without an income or prospects. While living in shabby lodgings in the Haymarket he was invited, on Halifax's recommendation, to write a poem in celebration of the Battle of Blenheim. He produced the *Campaign*, and his fortune was made. He was appointed a Commissioner of Excise in 1704, he was promoted to be Under-Secretary of State in 1706, he entered Parliament in 1708—where he is said never to have opened his mouth—he became secretary to Lord Wharton, the Lord-Lieutenant of Ireland in 1709, and was also made Keeper of the Records. In Ireland he came to know Swift well, who, like all his friends, speaks of him in the warmest terms of affection and admiration. From 1704 to 1710 his only literary production of any importance was the unsuccessful opera of *Rosamund*, but when the Whigs went out of office in the latter year he was in possession of a competence and free to devote himself to the chief work of his life. His friend, Richard Steele, had started the *Tatler* in 1709, and Addison from the first was a contributor. When the *Tatler* dropped in 1711 it was succeeded the next year by the still more celebrated *Spectator*, for which Addison wrote 274 of his wonderful essays, inimitable alike in their easy style and delicate humour. "He poured in paper after paper," says Thackeray in the *English Humorists*, "and contributed the stores of his mind, the sweet fruits of his reading, the delightful gleanings of his daily observation, with a wonderful profusion and, as it seemed, an almost endless fecundity." In 1713 the tragedy of *Cato* was put on the stage, and from its political application was at once a brilliant success, though the play itself is cold, correct, and uninteresting. Addison contributed various political papers to the *Whig Examiner* and the *Guardian*, and published, in defence of the Government, in 1715 and 1716, fifty-five numbers of the *Freeholder*. He was re-appointed Secretary for Ireland when the Whigs once more came into office in 1714, and made a Lord of Trade. About this time Pope broke with him, a quarrel made famous by the celebrated lines on "Atticus." In 1716 Addison made what is commonly regarded as an unhappy marriage with the Dowager Countess of Warwick, and during the next year he was Secretary of State for eleven months, but he resigned owing to failing health, and received a pension of £1,500 a year. In the *Old Whig* he defended the Peerage Bill of 1719, against the attacks of Steele in the *Plebeian*, but while the controversy was proceeding his health grew worse, and he died at Holland House on the 17th of June, 1719. He was buried in Westminster Abbey, Bishop Atterbury reading the service. He left one daughter by the Countess of Warwick, Charlotte Addison, who died unmarried in 1797.

Addison's Disease, a disease in which a peculiar bronzing of the skin is accompanied by the development of nausea, vomiting, and extreme debility. It was shown by Dr. Addison, of Guy's Hospital, to be intimately associated with tubercular disease of the suprarenal bodies, *i.e.* those

bodies placed at the front of the upper part of each kidney. The hue of the skin is the most characteristic symptom; it is distinguished from jaundice by the fact that the conjunctivæ (the mucous membrane lining the inner portion of the eyelids) remain unaffected.

Address, FORMS OF. The following are the correct ceremonious forms of superscription, commencement, and reference:—

The King or Queen.—The King's *or* Queen's Most Excellent Majesty; Sir *or* Madam; *or* May it please Your Majesty; Your Majesty.

Princes and Princesses.—His *or* Her Royal Highness the ——; Sir *or* Madam; Your Royal Highness.

Ambassador.—His Excellency —— H.B.M.'s Ambassador and Plenipotentiary; according to rank; Your Excellency.

Ambassador's Wife.—According to rank.

Archbishop.—His Grace the Lord Archbishop of ——; My Lord Archbishop; Your Grace.

Irish Archbishops consecrated since 1868 are styled The Most Rev. the Archbishop of ——, and the terms My Lord and Your Grace are not used.

Archdeacon.—The Venerable the Archdeacon of ——; Venerable Sir.

Baron.—The Right Hon. Lord ——; My Lord; Your Lordship.

Baroness.—The Right Hon. the Lady ——; Madam; Your Ladyship.

Baronet.—Sir John B., Bart.; Sir.

Bishop.—The Right Rev. the Lord Bishop of ——; My Lord Bishop; Your Lordship.

Scotch, colonial, suffragan, and retired bishops and Irish bishops consecrated since 1868 are styled the Right Rev. the Bishop of ——, and addressed Right Reverend Sir.

Canon.—The Rev. Canon ——; Reverend Sir.

Cardinal.—His Eminence Cardinal ——; Your Eminence.

Clergy.—The Rev. John B., the Rev. Lord ——; the Hon. and Rev. ——; Reverend Sir.

Consul.— —— Esq., H.B.M.'s Agent and Consul-General, Consul, or Vice-Consul, as the case may be.

Countess.—The Right Hon. the Countess of ——; Madam; Your Ladyship.

Dean.—The Very Rev. the Dean of ——; Very Rev. Sir.

Daughters of Dukes, Marquises, and Earls.—The Lady Mary B.; Madam; Your Ladyship. If married to a peer she takes his title; if married to a baronet, knight, or commoner, she changes her surname for his.

Daughters of Viscounts and Barons.—The Hon. Mary B; Madam. If married to a peer, or to the younger son of a duke or marquis, she takes his title; if married to a baronet or knight, she is styled the Hon. Lady ——; if married to a commoner, she changes her surname for his.

Doctor.—The letters M.D., D.D., etc., are placed after the usual designation, or else Dr. precedes, as The Rev. Dr. ——.

Dowager, Lady.—On the marriage of a peer or baronet, the widow of the previous holder of the title adds, The Dowager, or her Christian name, to her former designation.

Duchess.—Her Grace the Duchess of ——; Madam; Your Grace.

Duke.—His Grace the Duke of ——; My Lord Duke; Your Grace.

Earl.—The Right Hon. the Earl of ——; My Lord; Your Lordship.

Governor of Colony.—His Excellency —— Governor of ——; Your Excellency.

Judge.—The Hon. Mr. Justice ——; if a knight The Hon. Sir ——; Sir, on the bench My Lord.

Judge of County Court.—His Honour Judge ——; Sir, on the bench Your Honour.

King's Counsel.—Add K.C. to usual designation.

Knight.—Sir Thomas ——; Sir. Knights and companions of the English orders of knighthood have the initials K.G., K.C.M.G., C.B., etc., added to their usual designation.

Lord Advocate of Scotland.—The Right Hon. the Lord Advocate; My Lord, *or* Sir.

Lord Chancellor.—The Right Hon. the Lord High Chancellor; according to his rank as a peer.

Lord Chief Justice.—The Right Hon. the Lord Chief Justice of England, *or* the Right Hon. Sir —— Lord Chief Justice of England; if a peer, according to his rank, if not, as a judge.

Lord Lieutenant of Ireland.—His Grace if a Duke, otherwise His Excellency the Lord Lieutenant of Ireland; according to his rank as a peer.

Lord Mayor.—The Right Hon. the Lord Mayor of ——; My Lord; Your Lordship.

Lord Mayor's Wife.—The Right Hon. the Lady Mayoress of ——; Madam; Your Ladyship.

Lord of Appeal in Ordinary and his Wife.—As Baron and Baroness. Their children have no title.

Lord of Session.—The Hon. Lord ——; My Lord; Your Lordship. His wife has no title.

Lord Provost.—The Right Hon. the Lord Provost of ——; My Lord; Your Lordship. His wife has no title.

Marchioness.—The Most Hon. the Marchioness of ——; Madam; Your Ladyship.

Marquis.—The Most Hon. the Marquis of ——; My Lord Marquis; Your Lordship.

Mayor.—The Right Worshipful the Mayor of ——; Sir; Your Worship.

Members of the House of Commons.—Add M.P. to usual designation.

Minister Resident.—Add H.B.M.'s Minister Resident, to usual designation.

Officers in the Army and Navy.—The professional title is prefixed to any other rank, *e.g.* Gen. the Right Hon. Lord ——; Captain Sir —— R.N., but for Lieutenants or those of inferior rank the professional title is dropped.

Privy Councillor.—The Right Hon. precedes usual designation.

Secretary of State.— His Majesty's Principal Secretary of State for the —— Department.

Serjeant-at-Law.—Serjeant, or Mr. Serjeant.

Sons.—The eldest sons of Dukes, Marquises, and Earls bear by courtesy the second family title, and are addressed in every respect as if they were peers, and their children are addressed as if their fathers were peers.

The younger sons of Dukes and Marquises are styled The Lord John ——; My Lord; Your Lordship.

The younger sons of Earls, and the sons of Viscounts and Barons, are styled The Hon., and addressed as Sir.

Vice-Chancellor.—As a Judge; Sir, on the bench My Lord.

Viscount.—The Right Hon. the Viscount ——; My Lord; Your Lordship.

Viscountess.—The Right Hon. the Viscountess ——; Madam; Your Ladyship.

Adelaide, the capital of South Australia, giving its name to the environing county, was founded, 1836, on the river Torrens, which divides the

THE POST OFFICE, ADELAIDE.

town in two and flows into the Gulf of St. Vincent. It is remarkably well laid out, and the excellent arrangement of its streets has earned for

it the name of the "Model City." King William Street is the principal thoroughfare, and it possesses very fine terraces, as well as a Town Hall, a fine Post Office, Botanical Gardens, Cathedral, and University. The trade, which is considerable, has for its centre Port Adelaide, distant about seven miles, but connected by rail and water. The climate is warmer than that of the neighbouring colonies, but is healthy.

Adelaide, daughter of George, Duke of Saxe-Meiningen, was born in 1792, and married in 1818 William, Duke of Clarence, thus becoming Queen Consort of England 1830. Though much younger than the king, her strong character and sound common sense enabled her to exercise a powerful influence over him. On his death the queen dowager was treated with the utmost respect and affection by her niece, Queen Victoria, and enjoyed a very wide popularity. She died in 1849.

Adelung, JOHANN CHRISTOPH, born at Spantekow, in Pomerania, 1732; appointed professor at the gymnasium of Erfurt 1759, but resigning two years later, he resided as a private *littérateur* at Leipsic until 1787, when the Elector of Saxony made him his librarian, with the title of Hofrath. His life was devoted to study, and he did much to fix the standard of his native tongue, then despised and broken up into dialects. Somewhat arbitrarily he set up the idiom of Upper Saxony as the perfection of German, and attempted to force grammar and vocabulary into conformity with that ideal; still his *Dictionary of the German Language* remains a monument of industry and erudition. In his incomplete work *Mithridates* he laid the foundation of the science of comparative philology. He died in 1806.

Ademption. Where property which a testator devises or bequeaths specifically is changed in character before his death (for instance, if he after making his will devising a particular estate disposes of such estate by sale or otherwise), the devisee gets nothing.

Aden, a seaport of Yemen, in Arabia, situated on a peninsula 100 miles E. of the Strait of Bab-el-Mandeb. It was taken by the British in 1839, and on the establishment of the overland route to India became an important coaling station. It possesses a good harbour and magnificent water tanks, and though hot is not unhealthy. At present 1,600 vessels call there during the year; the exports amount to nearly two millions, and the imports to about half a million more. The town is built to the east of the peninsula. The settlement is under the Government of Bombay, and the surrounding territory belongs to the Sultan of Lahej.

Adenitis, inflammation of the lymphatic glands, not unfrequently associated with angeioleucitis, or inflammation of the absorbent vessels. In the latter affection the course of the inflamed lymph canals may be traced as red lines beneath the skin; it is usually excited by a wound. Adenitis may occur, however, alone, and not uncommonly results in an abscess; it may be regarded as a conservative process, tending to prevent the passage of poisonous material beyond the lymphatic gland and into the general circulation.

Adenoid Tissue, that form of tissue which is met with in lymphatic glands, adenocele or adenoma being an abnormal growth or tumour made up of such tissue.

Aderno, the ancient Adranum, a city of Sicily, 17 miles N.W. of Catania, and near the foot of Etna. Though clean, well-built, and full of churches and monasteries, it is unhealthy.

Adeta, the group of Spatangoid sea urchins in which there are no fascioles. [FASCIOLE.]

Adhesion, as used in pathology, an unnatural union of parts, as the result of inflammation; it is also applied to the process occurring in the healing of wounds. Adhesions may occur between joint surfaces and, preventing free movement, may require to be "broken down."

Ad hominem or Argumentum ad hominem, in logic, an argument based on an appeal to either a man's conduct or professed principles. Rom. ii. 17 furnishes an example of this argument.

Adiantum, the genus of ferns known as Maidenhair, including upwards of sixty species, natives of hot and temperate climates. They have slender hair-like leaf-stalks, often black; leaflets,

ADIANTUM (*Capillus veneris*).

generally trapezoid, pinnate, or pedate; veins, forked or netted; and fructification, oblong or rounded, and covered by the reflexed margin of the frond. They are closely related to the Bracken (*Pteris*). A syrup is prepared from them, known as Capillaire.

Adiaphorists, the name given to those Lutherans in the 16th century who maintained, with Melanchthon, that many of the doctrines and practices in dispute between the Church of Rome and the stricter Lutherans were indifferent or unimportant.

Adige (Germ. ETSCH, anc. ATHESIS), a river of Italy formed by the confluence near Glarus of many streams from the Rhætian Alps; flows E. to Botzen, whence it is navigable, passes into Lombardy, near Roveredo, and turning first S., then E., falls into the Adriatic at Porto-Fossone, near the mouth of

the Po, after a course of 220 miles. It is rapid, shallow, and very liable to floods. Trent, Legnago, and Verona are on its banks.

Adipocere (*adeps*, fat; *cera*, wax), a substance produced by the degenerative changes which occur in dead bodies. It is fatty in nature, and is not infrequently found in disinterred coffins.

Adipose Tissue, or fatty tissue, is widely distributed throughout the human body; a layer of it exists beneath the skin, and its presence there is of considerable importance in maintaining the temperature of the body, fat being a bad conductor of heat. Among parts which are devoid of adipose tissue may be mentioned the subcutaneous tissue of the eyelids. Microscopically it consists of little vesicles, which present a sharply defined edge, and are composed of a structureless ensheathing membrane of protoplasm, forming a sort of microscopic bag, in which fatty matter is contained. A good example of such fat globules may be readily seen in a drop of milk when examined under the microscope, but here the globules float freely in the containing fluid, whereas in adipose tissue they are held together by a network of fibres.

Adirondack Mountains, between Lakes Champlain and Ontario, in the State of New York, U.S.A. They consist chiefly of granitic masses, with extensive forest growths, rising from a plateau 2,000 feet above the level of the sea. The highest summit, Mount Marcy, attains 5,337 feet. The Hudson river and the Richelieu river have their sources here.

Adjudication, the judgment or decision of a court in any litigation or proceedings before it. It has also a particular signification in the English bankrupt law, and means the order adjudging the debtor to be a bankrupt and vesting his property in a trustee. In Scotland the analogous proceeding is termed a decree of sequestration, but it differs in some essential points from adjudication as understood in English bankruptcy law.

Adjutant (*military*), an officer attached to each regiment of horse or foot whose special duty is to assist the commander. An adjutant is never above the rank of major, and generally serves for four years. He has the task of communicating the orders of his commander to the different subordinates. The *Adjutant-General* is a high official whose duties towards the whole army are similar to those of an ordinary adjutant to his regiment. His duties include the carrying out of all orders relating to the equipment, instruction, recruiting, and efficiency of troops, and he is the medium for all reports.

Adjutant (*Zoological*), (*Leptoptilus argala*), a gigantic stork-like bird from tropical India. It ranges from 5ft. to nearly 7ft. in height; bill long, head, neck, and gular pouch bare; at the back of the neck is a second pouch which is inflated during flight; plumage, ashen-gray above, white below. It is a voracious bird, and feeds on carrion and offal, and in some places is protected by law for its usefulness as a scavenger. The popular name is said to be due to the fact that it frequents camps and parade grounds. The marabou plumes of commerce are obtained from the under feathers of the tail and

ADJUTANT (*Leptoptilus argala*).

wings of this species and its African congener, the Marabou (*L. marabou*), but those from the former are the more valuable.

Ad libitum, a term used in music to signify that the performer may use what time or expression he pleases. When used of instruments, as "with flute ad libitum," it signifies that the flute part may be performed or left out at pleasure.

Admetus, son of Pheres, king of Pheræ, in Thessaly, where Apollo served for a time as shepherd. By the help of the god Admetus obtained the hand of the daughter of Pelias, Alcestis, who died for him, but was rescued from death by Heracles.

Administration, the ordering and disposition of the affairs, financial and otherwise, of a kingdom, a company, a private individual, a bankrupt, etc. It has also a special signification in regard to deceased persons and their estates. In the year 1857 the Court of Probate was constituted, and the granting of probates and administrations is vested in this branch of the Supreme Court. The grant is usually made to one or more of the deceased's relatives, who are termed the administrator or administrators. The husband has an absolute right to administer to his wife's estate, and the wife is usually preferred in the case of her husband's. Where there is no husband or widow the next of kin, according to relationship, may administer, and the court, if a fit case be shown, has power to appoint as administrator a creditor or person entirely without interest in the estate.

In politics *Administration* is specially applied to the Ministry (q.v.) or the executive government.

Admiral, *Vice-Admiral*, and *Rear-Admiral*, the various gradations in rank of the highest

naval officers in the British navy. Of *admirals*, a very small number are called *admirals of the fleet*, and these officers are distinguished from ordinary admirals by receiving additional pay, without additional command; the ordinary *admirals* display their flags at the maintopgallant masthead, and rank with generals in the army; a *vice-admiral* displays his flag at the foretopgallant masthead, and takes rank with a lieutenant-general; while *rear-admirals* carry their flags at the mizzentopgallant masthead, and rank with major-generals. The distinction which formerly existed of three different coloured flags is now done away with. The office of *Lord High Admiral* has not been held since 1828, when it was held by William IV., then Duke of Clarence. The office was frequently held by Princes of the blood Royal, James II. holding it for several years during Charles II.'s reign, when he was Duke of York. The duties are now performed by commission. [ADMIRALTY COURT.]

Admiral. [VANESSA.]

Admiralty, Board of, the department which has the management of everything relating to the British navy. There are six Lords of the Admiralty, two of whom are *civil lords*, the four others being *naval* or *sea lords*. The senior *civil lord*, known as the First Lord of the Admiralty, is a member of the Cabinet, and is responsible to Parliament for all the business of the Department. Under the *lords* of the Admiralty there are the Secretaries, two in number: the Parliamentary and Financial Secretary, whose duties are parliamentary; and the Second Secretary, whose post is a permanent one.

Admiralty, Court of, a Court of Law formerly presided over by the Lord High Admiral, and after the abolition of that office carried on by commission. The High Court of Admiralty (now part of the Probate, Divorce, and Admiralty Jurisdiction of the High Court of Justice) has jurisdiction upon the high seas in all British seas. It has a civil or instance jurisdiction, and a prize jurisdiction in time of war. The latter does not extend to the Irish or Scotch Admiralty jurisdiction. The questions arising in time of peace are chiefly *collisions*, *seaman's wages*, *bottomry*, *wearing unlawful colours*, *salvage*, and *causes of possession*. Causes under the Slave Act Treaties are also cognisable. The evidence is all documentary. The criminal jurisdiction of the Court of Admiralty extended some time since to all crimes committed at sea which were triable at common law if committed on shore, but such offences are now subject to be dealt with at common law on surrender.

Admiralty Island, belonging to the United States, is in lat. 58° N. and long. 134° W. Its size is 90 miles by 25 miles.

Admiralty Islands, a group of forty islands, the largest being 50 miles long, situated N.E. of New Guinea, between lat. 2° and 3° S. and long. 146° 18′ and 147° 46′ E. They are covered with a luxurious growth of cocoa-nut trees, and have a native population. The Dutch discovered them in 1616, but they are rarely visited. They were annexed by Germany in 1885, and form part of the Bismarck Archipelago.

Adnate, a term employed in botany to describe adhesion or union of two dissimilar structures, as opposed to *connate* or *coherent*.

BRANCH OF LINDEN (showing *adnate* bract).

For example, the leafy bract in the Linden is adnate to the flower-stalk, or epipetalous stamens are adnate to the corolla.

Adolphus, JOHN, born in London 1768, and called to the bar 1807. He did a considerable practice at the Old Bailey, his defence of the Cato Street conspirators being his ablest piece of work. In literature he was widely and favourably known as the author of *The History of England from the Accession of George III. to 1783*, and other books. He died in 1845.

Adonai, a Hebrew name for God. The Jews fear to pronounce the word Jehovah and speak the word Adonai whenever they meet with Jehovah in reading.

Adonis (Heb. Adonaï), the mythical lover of Venus, was killed by a boar, and the goddess turned him into a flower of the colour of his blood. He was allowed to quit Hades for six months in every year for the purpose of consoling his admirer. General lamentations marked the anniversary of his death, which is supposed to have typified the passage from summer to winter. He is identified with the Phœnician Thammuz and the Egyptian Osiris.

Adonis, or Pheasant's-eye, a small genus of Ranunculaceous plants with bright red or yellow flowers and much divided leaves, natives of Europe and Asia.

Adoption, an act by which paternal and filial relations are established between persons not filling that character by nature. Adoption in this sense was very prevalent among the Greeks and Romans, and was strictly regulated under their laws. Adoption has never been an institution in England or Scotland. The benefits arising therefrom may, however, be conferred by deed, as where a testator places himself *in loco parentis*, but a contract with the true parent is necessary before any legal obligation is incurred by the adoptor. In

the United States there are express statutes regulating adoption. It is generally accomplished by mutual agreement in terms prescribed by law, and binding upon the adoptor who agrees to treat the one adopted as his own child, towards whom he will fulfil all parental duties, while the child adopted takes upon himself all the duties and obligations of a child towards his or her parent. These laws are various in the several States, though they all have the same general purpose.

Adoptionists, the name given to those who in the eighth century advocated the belief that Christ was adopted, not born, the Son of God.

Adrastus, one of the legendary Greek heroes, the son of Talaus, king of Argos. Driven from his country by Amphiaraus, he took refuge at Sicyon, where his maternal grandfather reigned, and ultimately became sovereign himself. Being reconciled to Amphiaraus, he returned to the throne of Argos. He took up the cause of his son-in-law Polynices against Eteocles, and joined in the expedition of the Seven against Thebes, being the sole survivor at the end of the struggle. Two years later he stirred up the war of the *Epigoni*, in which he lost his son Ægialeus. He died of grief at Megara. The Nemean games were believed to have been instituted by him.

Adria, an ancient Italian city of Etruscan origin, and once a seaport. It is situated in the province of Rovigo, between the Adige and the Po. The neglect of the dykes has separated it from the sea, and its prosperity declined before the Roman period.

Adrian. The name of six popes, of whom three were distinguished; viz. :

Adrian I. (772–795), a contemporary of Charlemagne, who protected him against the encroachments of Desiderius, king of Lombardy. The 7th Œcumenical Council of Nicæa (Nice) was held in his pontificate, and restored the worship of images (787). Charlemagne, calling a general council of the West (794), condemned the worship but sanctioned the use of these symbols, much to the Pope's annoyance. He was an independent, liberal, and able pontiff.

Adrian IV., NICHOLAS BREAKSPERE, the only English Pope, was born at St. Albans, and settled in France as abbot of a monastery near Avignon, 1137. The strictness of his discipline recommended him to Eugenius III., who made him Cardinal-Bishop of Albano; and upon the death of Anastasius IV. (1154) he was raised to the Holy See. He held very advanced views as to papal supremacy, and began a quarrel with the Emperor Frederick (Barbarossa), which led to a rupture under his successor Alexander III. He died in 1159.

Adrian VI. of Utrecht, tutor to Charles V., and successor in the papal chair of Leo X., 1521. He attempted to reform the Church, and especially to mend the lives of the higher clergy. He thus rendered himself very unpopular, and his death (1523) was hailed with much delight.

Adrian, capital of Lenawee Co., Michigan, in the United States, 73 miles S. of Detroit, on the Michigan S. Railway, and a branch of the Raisin river. It is the centre of a grain-growing district, and has many mills worked by water-power.

Adrianople (Turk. EDRENEH), a city in Roumelia, on the banks of the Tundja, 137 miles W.N.W. of Constantinople. Formerly known as Uskadama, it was improved and adorned by the Emperor Hadrian, who gave it his name. The Turks took it in 1360, and it was the seat of their empire in Europe till the capture of Constantinople, 1453. The ruins of the sultan's palace (Eski-Serai), the bazaar of Ali Pacha, and the mosque of Selim II. attest its former grandeur. A great deal of trade is done in raw silk, Turkey red, cotton, attar of roses, and wine, which is produced abundantly in the district. It was taken by the Russians in 1829, and again in 1878.

Adriatic Sea (*Mare Adriaticum*) derives its name from Adria (*see* above), and divides Italy, on the W., from Trieste, Croatia, Dalmatia, and from Albania on the E., having an extreme length of 450 miles and a mean breadth of 90 miles. Its depth varies from 12 to 22 fathoms; the tides are slightly more marked than in the Mediterranean; the water, too, is more salt. Its chief ports are Venice, Trieste, Ancona, and Brindisi, the latter having sprung up into importance since becoming the place of embarkation for India. The Italian shore is low and marshy, but the opposite coast presents generally a steep rocky front, broken by many safe creeks and inlets. The gales from S.E. and N.E. render navigation rather dangerous.

Adullamites, the name given to a political party which arose in 1866, and was led by Mr. Lowe (Lord Sherbrooke), who objected to some of the proposals of Mr. Gladstone's Franchise Bill. The term was one of derision, referring to David's sojourn in the Cave of Adullam, when he was followed by all who were "in distress, in debt, or discontented."

Adulteration. "The act of debasing a pure or genuine article for pecuniary profit, by adding to it an inferior or spurious article, or taking one of its constituents away." Until 1860, so far as the law was concerned, traders were free to adulterate the articles they dealt in to any extent. In 1855, however, Mr. William Scholefield, one of the members of Parliament for Birmingham, moved for a Select Committee of inquiry into the adulteration of foods, drinks, and drugs. The disclosures made before this committee, which sat for two sessions and presented three reports, were such that legislation followed in 1860, giving permissive power to local authorities to appoint analysts and imposing penalties of a somewhat mild character upon offenders. Under this Act practically nothing was done. In 1872 the Adulteration of Food Act became law, and in this the appointing of analysts was made compulsory. In 1874 a Select Committee was appointed to inquire into the operation of the Adulteration of the Food and Drinks Act, 1872, and this committee recommended the consolidation of

the Acts of 1860 and 1872. This was done in a Government measure, and the Sale of Food and Drugs Act, 1875, with its Amendment Act, 1879, embodies the present law relating to adulteration, According to these Acts the mixing of injurious ingredients in any food or drug meant to be sold is forbidden under a penalty not exceeding £50 for the first offence, and not exceeding six months' hard labour for subsequent offences. If the seller of articles so mixed with injurious ingredients can prove that it was impossible for him to know of the presence of these ingredients, such proof is an adequate defence. Again, the selling of food and drugs "not of the nature, substance, and quality of the article" demanded by the purchaser is forbidden under a penalty of £20. It is also forbidden, under a penalty not exceeding £20, to abstract from an article of food any part of it so as to affect injuriously its quality, substance, or nature, and to then sell this article without giving notice of its altered character. Any purchaser that suspects the articles he buys may have them analysed by the public analyst on paying a fee not exceeding ten shillings and sixpence for each case, and for this he is entitled to receive from the analyst a certificate of the result of the analysis. Many private purchasers call in the services of the analyst, not with a view to prosecuting tradesmen, but for their own guidance, and if they find the articles submitted to analysis to be tampered with, they change their custom. If a prosecution be intended it is necessary for the purchaser at the time of making the purchase to tell the seller of his intention to have the article bought analysed, and to offer to divide the article into three parts—one to be left with the seller, one for himself, and one for the public analyst. If the seller declines the offer then the whole is taken to the analyst, who divides it into two, one for analysis and one for the purchaser. Prosecutions for adulteration are usually based on purchases made by inspectors and police-constables, and any dealer refusing to sell to such any article offered for sale in his shop is liable to a penalty of £10. There is a special provision in the Act dealing with tea, which is thereby examined by the Customs on importation, and if found unfit for human food is destroyed. The extent to which tea used to be adulterated may be inferred from a report presented to the House of Commons in 1783, where it is stated that four million pounds were annually manufactured in England from sloe and ash leaves—this, too, at a time when the total imports into this country were only six million pounds. Dr. A. W. J. MacFadden on behalf of the Local Government Board, in 1908, just after the sensational "Tinned Meat Revelations," made a series of investigations in regard to such commodities, and found that, out of 1,733 tins or glasses of meats examined, 333 or nearly 20 per cent. contained illegitimate preservatives. A large number of the prosecutions that take place under the Food and Drugs Act are through the fraudulent manipulation of milk and butter. Among the recent enactments may be mentioned the Trade Marks Act, 1905, which protected leading articles of consumption against fraudulent imitation by substitution of inferior qualities; also the Public Health (Regulations as to Food) Act, 1907, the strengthening of which was recommended in 1908 as a result of inquiries throughout England by a special representative of the Local Government Board. A special Act was passed in 1887 relating to the adulteration of butter, and consequent upon the report in 1906 of the Select Committee of the House of Commons on the question of butter adulteration, the Butter and Margarine Act of 1907 was passed and came into force January, 1908. To give an exhaustive statement of the extent to which adulteration is practised would be to recount nearly every article that enters into human consumption.

Adultery, according to English law, the sexual intercourse of a married person with some person other than his or her wife or husband. Among the Greeks and in the earlier period of Roman law, and according to the Scriptures (as expounded by some of the best commentators), it is not adultery except where a married woman is the offender. In Britain it has been reckoned a spiritual offence, and cognisable by the spiritual Courts. The common law only allowed the party aggrieved his action for damages. In England the husband can claim damages from the adulterer in a petition for dissolution of the marriage. Adultery alone on the part of the wife entitles the husband to a dissolution of the marriage, but the wife is only entitled to a dissolution against the husband where there has been, in addition to the adultery, some other offence, as bigamy, gross cruelty, or desertion with one who is within the prohibited degrees of consanguinity the offence alone is sufficient for divorce. She is, however, entitled to a judicial separation in case of adultery alone or of the other offences alone. [DIVORCE.] It seems probable that as a result of the special Commission on Divorce, which held its sittings during the summer of 1910, the report thereon will contain some strong recommendations in regard to the legal position of husband and wife when adultery has taken place.

Ad valorem ("according to value"), a term used in the Customs, and applies to those duties which are levied on goods, not according to their number or weight, but according to their estimated worth.

Advent ("the coming"), in the Church Calendar, is the name given to the four weeks preceding Christmas, or more exactly, which include four Sundays, commencing with the Sunday which falls nearest to St. Andrew's Day (Nov. 30th)—either on, before, or after that day. It is regarded as preparatory to Christmas as Lent is preparatory to Easter. Advent, however, is never so strictly observed as to fasting, etc., as Lent.

Adventists and Seventh-day Adventists. The Adventists looked for the second coming of Christ in 1843, but latterly have called themselves Seventh-day Adventists, and teach that the event, though imminent, is indefinite. The Adventists, an American sect, were formed in 1833.

Adventitious Buds, those which occur in no definite order, as on the heads of pollarded trees. The term *Adventitious* is similarly applied to those roots which, like those of the strawberry, are not in acropetal succession, *i.e.* which develop in regular order from below upward. Leaves are never adventitious.

Advertisement, a public notification of some fact affecting the financial or other interests of either the advertiser or the person addressed. It is usually effected through the medium of newspapers, magazines, bills, posters, distribution, etc. The duty on advertisements was first enacted in 1712, and its abolition in 1853 gave a great impulse to advertising. £100,000 a year spent in advertising is nowadays thought by no means extraordinary. A leading daily paper will carry about £2,000 of advertisements per day in ordinary issues, and not infrequently £3,000. The record for one week in London, in one daily, stands at £17,000.

Advocate, a lawyer trained and authorised to plead for clients in the Courts of Law. In Scotland the term is synonymous with that of barrister in England, and so also in most European countries. In the United States no distinction exists, as in Great Britain, between barrister or advocate and solicitor.

Advocate-General, the adviser of the Crown in questions of military and naval law.

Advocate, LORD, the name given to the principal Public Prosecutor in Scotland. He is assisted by a Solicitor-General and some junior counsel as subordinate assistants. The office was established in the early part of the 16th century. Formerly he had no authority for the prosecution of criminals without the concurrence of some private person, but in the year 1597 the power without any such concurrence was conferred upon him. If the Lord Advocate decline to prosecute, a private party may do so.

Advocate, KING'S, an officer whose duty is to advise and act as counsel for the Crown in questions of civil, canon, and international law.

Advocates, FACULTY OF. The Faculty of Advocates in Edinburgh constitutes the Bar of Scotland. It consists of about 400 members, but the number of those in actual practice does not exceed 130. The profession has existed in Scotland from an early period, and in the year 1424 an Act was passed securing assistance to the poor from advocates. The advocates of Scotland date as a faculty or society from the institution of the College of Justice in the year 1532. The amount of litigation carried on in the Courts greatly diminished during the nineteenth century, in consequence chiefly of improvements which have been made in the Sheriff's Courts. The Bar in Scotland is, however, still regarded as the chief introduction to public and official life in Scotland. It is recruited from all ranks of society. An advocate is entitled to plead in all the Scottish Courts—also before the House of Lords. There are two necessary examinations to be passed before admission—one in general knowledge; the other in law. The first is dispensed with for Masters of Arts of a British university, or where applicant has a foreign university degree. Fees on admission, about £330. The Dean of Faculty is elected from this body, and he has precedence over all the other law officers.

Advocates' Library, a library belonging to the Faculty of Advocates in Edinburgh, founded by Sir George Mackenzie, of Rosebrough, Dean of Faculty, in the year 1682. The first librarian was appointed in 1686. In 1700 it was removed to Parliament House, where it still exists. It has the privilege of receiving a copy of every book entered at Stationers' Hall. The number of volumes is now computed at over 305,000.

Advocatus diaboli (the devil's advocate), in the Romish Church the term applied to the functionary appointed to bring forward every possible objection to any person's canonisation, as opposed to the *Advocatus Dei*, who pleads the cause of the candidate.

Advowson, in the Church of England, the perpetual right of presentation to a vacant benefice; it is of three kinds:—(1) *Presentative*, when the patron presents his clerk to the bishop, who institutes him; (2) *Collative*, when the bishop owns the advowson, in which case he presents as well as institutes the clerk; and (3) *Donative*, where no presentation is necessary, because the king, or some licensed subject, has founded the church, not subject to the bishop. An advowson attached to a manor is termed an *advowson appendant*, but when sold to a purchaser becomes an *advowson in gross*.

Adze, an instrument composed of a handle and an arched cutting blade, differing from the axe in having the blade transverse to the handle. It is used by carpenters, shipwrights, etc., for chopping the surface of timber.

Æcidium, or Clustercups, the name formerly applied to a genus of fungi parasitic upon living flowering plants, but now known to be only a stage in the life-history of what was considered a distinct group, the *Uredineæ*. They are sometimes called *Æcidiomycetes*, the "rust" of wheat *Puccinia graminis* being the best known example of the group. Some species are *autœcious*, passing through all stages on one host-plant; others, such as the rust, are *heteœcious*, passing parts of their life-cycle on distinct hosts. The black two-celled spores (*teleuto-spores*) produced on straw in autumn, in the case of the rust appearing in linear clusters, germinate in spring, producing short tubes or *promycelia*, the branches of which terminate in *sporidia*. These sporidia will only germinate on the leaves of the barberry, the epidermis of which they perforate, producing "spawn" or *mycelium* threads in their interior. On these barberry-leaves yellow spots soon appear, which burst into cup-like

ÆCIDIUM.
1. *Leaf of Berberis with cluster cups; 2. A few magnified.*

structures filled with chains of spores. These clustered cups are still termed *æcidia* and their spores *æcidiospores*, but they were formerly supposed to complete the life-history of the fungus *Æcidium berberidis*. The æcidiospores of the barberry will only germinate on the surface of a grass such as wheat, and in from six to ten days, burst out in linear masses of orange spores (*uredo-spores*), formerly known as *Uredo*. These uredo-spores will germinate on grass, giving rise to others like themselves; but towards the close of the season are replaced on the same spawn by the black teleutospores known as *Puccinia*. Thus three apparently distinct fungal parasites are found to be merely stages in the life of one. It is suggested that the æcidia are sexually produced within the barberry leaf. Another species of this large group causes the "witches' broom" in fir trees.

Ædile, the name given to a Roman magistrate whose business it was to look after the roads, aqueducts, sewers, weights, measures, and public worship. Originally there were two ædiles, who were chosen from the plebeians, and called *Ædiles plebis*; later two others, called *Ædiles curules*, were chosen from the patricians, and Julius Cæsar appointed a new order of *Ædiles cerealis* to take charge of the public granaries.

Ædui, the name of a powerful tribe which inhabited the territory between the Saône (Arar) and the Loire (Liger) in Gaul at the time of Cæsar's invasion (58 B.C.). At first they made common cause with Cæsar against Ariovistus, but later they followed Vercingetorix in his final effort at Alesia (Alise-Sainte-Reine).

Ægean Sea, the classical name of that portion of the Mediterranean which lies between Greece and Asia Minor, now known as the Grecian Archipelago (q.v.). The influence which this narrow gulf, with its numberless islands and bays, exercised upon the Greek character can hardly be overestimated. The origin of the name is lost in antiquity; some trace it to the town Ægæ, others to Ægea, a doubtful Amazonian queen, others to King Ægeus.

Ægeus, a legendary king of Athens, son of Pandion, and father of Theseus. In his days, Minos of Crete imposed on the Athenians a yearly tribute of seven youths and seven maidens as food for the Minotaur. Theseus, being one of the sacrificial batch, determined to rid the world of the monster, and agreed with his father to hoist white instead of black sails on the returning vessel if he was successful. This he forgot to do, and Ægeus seeing a black sail on the horizon threw himself into the sea, which henceforth bore his name.

Ægina, an island 8 miles long by 6 broad, lying 20 miles distant from Athens, in the Saronic Gulf. It is rugged, for it contains Mount Oros and the Panhellenian Ridge, but tolerably fertile, and very healthy. It was the home of the legendary Æacus, and named from his mother. At the date of the battle of Salamis it rivalled Athens in naval power, and to this day ruins of walls and towers remain. Athenian jealousy ended by crushing the fortunes of the island, which was colonised by the victors. Lysander in vain restored the former inhabitants. Later on Ægina passed under the sway of the Venetians, who transferred it to the Turks, 1715, but in 1828-9 it shared in the liberation of Greece. The famous Æginetan marbles preserved at Munich formed part of a fine temple probably dedicated to Panhellenian Zeus.

Ægineta, PAULUS, a Greek physician and voluminous writer of the 7th century A.D. His works form a mine of information on the surgery of his time.

Ægis, in Homer, the shield of Zeus (Jupiter). Later the term was used for the shield of Athene (Minerva), and was represented as a sort of breastplate with Medusa's head in the centre, and fringed with snakes. It is symbolic of a shielding or protecting power.

Ægisthus, the mythological son of Thyestes and Pelopea, who, having been adopted as a son by Atreus, seduced Clytemnestra, the wife of Agamemnon, then absent in the Trojan War. On the return of the latter, Ægisthus, with his paramour's assistance, slew him, and reigned in Mycenæ for seven years, when he was killed by Orestes. The story furnished Æschylus with a plot for three of his tragedies.

Æglina, a genus of Trilobites (q.v.).

Æglinidæ, a family of Ordovician Trilobites characterised by the possession of few rings in the body, and large head, tail, and eyes.

Ægoceratidæ, a well-known family of AMMONITES found in the lower Jurassic.

Ægophony, a term applied to a peculiar sound, said to resemble the bleating of a goat, whence its derivation, and occasionally heard on auscultation of the chest, particularly in cases of pleural effusion.

Ægospotami, a small river in the Thracian Chersonesus, falling into the Hellespont near Sestos, having a town on its banks. The Athenians under Conon were severely defeated here (405 B.C.) by the Lacedæmonians under Lysander, and one consequence of this disaster was the capture of Athens and the conclusion of the Peloponnesian War.

Ælfric, a learned Saxon writer known as "the Grammarian." About his life little is handed down to us. He flourished at the end of the tenth and beginning of the eleventh centuries, was a pupil of Ethelwold and a friend of Dunstan. He appears to have been occupied in teaching at Winchester first, and afterwards at Cerne in Dorsetshire. His works are numerous, including a *Grammar and Glossary* in English and Latin, a *Colloquium*, his *Homilies*, and treatises on the Old and New Testament.

Æluroidea, a division of Fissiped Carnivora, containing the Felidæ (Cats), Viverridæ (Weasels), Protelidæ (Aard-wolf), and Hyænidæ (Hyænas). [CARNIVORA.]

Æneas, a legendary Trojan prince, son of Venus and Anchises. He appears in the *Iliad* as a

comrade of Hector, and Virgil made him the hero of the *Æneid*. In that poem he is described as escaping from burning Troy with his father on his shoulders, carrying his household gods, and leading his son, Ascanius, by the hand. His wife Creusa was lost in the tumult. After many adventures, the principal of which was his love affair with Dido, the queen of Carthage, Æneas landed in Latium, allied himself with Latinus, the king of the country, married his daughter Lavinia, and founded Lavinium. His rival Turnus, king of the Rutulians, was killed in battle, and the *Æneid* carries the story no farther. Livy, taking up the narrative, says that he reigned for three years in Latium; was slain in a war with the Rutulians, aided by Mezentius of Etruria, and was carried up to heaven. Ascanius, his son, who changed his name to Iulus, was claimed as the forefather of the Julian Gens.

Æolian Action, the action of wind (so called from Æolus, god of winds), one of the minor agencies in geology. The transporting action of wind forms the shifting sand-dunes along the coast and the sand-storms in the desert, burying buildings or obstructing streams. To it is also attributed the accumulation of the loess in the interior of continents, as in China, and in the great plains west of the Mississippi, a fine-grained dust containing few land-plants or shells, and sometimes hundreds of feet thick. By blowing sand, wind exercises an erosive power, varying with the square of its velocity, which seems to have produced the undercutting of some sandstone rocks, such as the Toad Rock, Rusthall, near Tunbridge Wells, and the buttes of the Colorado deserts.

Æolian Harp, an instrument made by stretching catgut strings over a thin piece of wood generally shaped like a box; this is placed in a window (opened sufficiently to admit it), and the wind passing over the strings produces a succession of beautiful sounds, very low and mournful when the wind is slight, but increasing in strength and height as the wind increases.

Æolian Islands, a group of volcanic origin to the N. of the Straits of Messina, now called the Lipari Islands; mentioned in Hom. *Od.* x. 1. The chief of these are Hiera, Strongyle, Didyme, Phœnicusa, Euonymus, and Ericusa; their modern names being Vulcano, Stromboli, Salina, Felicudi, Panaria, and Alicudi. Their ancient appellation is derived from Æolus, the god of winds, who was supposed to govern them.

Æolidæ, a family of shell-less sea slugs or Nudibranchiate Gasteropods.

Æolus, the mythological son of Hippotes, who was descended from Æolus, son of Hellen, the progenitor of the Æolian Greeks. He was regarded as the divine controller of the winds, his home being placed in Lipari or Stromboli. (*See* Hom. *Od.* x. and Virg. *Æn.* i.)

Æpyornis, a genus of sub-fossil ratite birds, with three or four species, from Madagascar. The egg of *Æ. maximus* is computed to have three times the capacity of an ostrich's egg.

Æqui, a tribe of Italy who were a source of trouble and irritation to the Roman Republic. They inhabited the north-east corner of Latium, and made frequent raids upon the Roman territory. They were not finally subdued until 302 B.C.

Æquoridæ, a family of jelly-fish of interest, as it includes some of the best preserved fossils of this group; they come from the lithographic stone of Solenhofen.

Aerated Bread, bread made by machinery, with flour moistened with prepared carbonic acid water, which makes the bread light and porous. Aerated bread is not so sweet-tasting as ordinary bread, but is made quicker, is absolutely pure, and is not touched with the hand in making.

Aerated Waters, waters made effervescing by the introduction of carbonic acid gas. *Carbonic acid water*, or Soda Water, is the most common, but there are many waters, such as Seltzer, Apollinaris, Vichy, which are naturally aerated. The manufacture of simple aerated water mixed with fruit syrup or other flavouring is very extensive. Gasogenes may be obtained for manufacturing aerated waters at home. [MINERAL WATERS.]

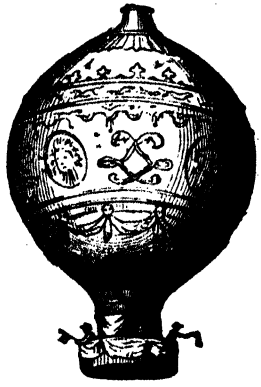
Aerial Roots, roots produced in the air, which mostly also take in nourishment from atmospheric moisture. They are accordingly almost confined to tropical plants. The roots put out by the climbing stems of ivy serve to attach the plant and take in water that may trickle down the trunk on which it grows. Most aerial roots, such as those of the banyan (*Ficus indica*), are produced adventitiously from the branches; but in mangroves they are tap-roots produced by the germination of seeds in fruits still hanging on the parent tree. In both these cases the aerial roots grow to the ground or mud, acquire a thick cork, and resemble stems externally. Many tropical orchids are epiphytes, attached to the boughs of trees by green aërial roots which never reach the ground.

Aerobic, or Aerobiotic. Micro-organisms have been divided by Pasteur into aerobic and an-aerobic, the former term being applied to those which are only able to grow in the presence of oxygen.

Aerodrome. A name given by Prof. Langley of the Smithsonian Institution, Washington, U.S.A., to a heavier than air flying machine he built in 1896, and which made a successful flight over the Potomac River. [*See* AERONAUTICS.] The term, however, has come into more general use to designate a place set apart for aeronautical evolutions and experiments, or to signify a large erection for housing airships, whether dirigibles or aeroplanes.

Aerodynamics, that branch of dynamics which treats of the force-relations of air or other elastic fluids. It is usually studied in conjunction with hydrodynamics (q.v.), of which it may be regarded as a special application. If the force-relations are such that equilibrium is the result, we have the division aerostatics. If motion is produced, aerokinetics. Aeronautics (q.v.) is also related.

Aeronautics. The problem of aeronautics has exercised the minds of men from the days when, according to tradition, Dædalus "flew with wings" across the Ægean sea, but it has only been of comparatively recent years that practical issue has been given to the nebulous ideas that were present with the earliest experimenters. These pioneers in aviation endeavoured to work out the problem of aerial flight by seeking to imitate the wing motion of birds, in which they were consistently met with the great problem of securing a sufficiency of power. We are told that artificial wings were used in England as early as the ninth century and, stepping over the centuries it is well authenticated that the famous Italian, Leonardo da Vinci, produced a number of mechani-

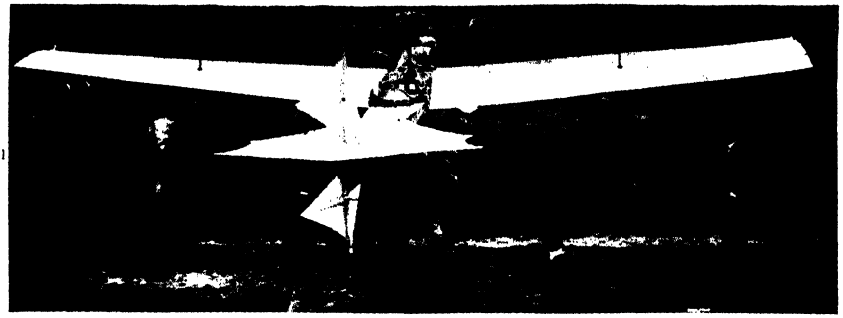


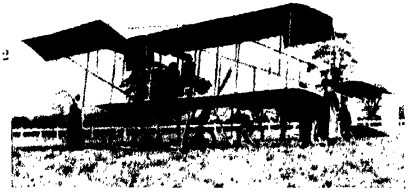
ROZIER'S BALLOON.

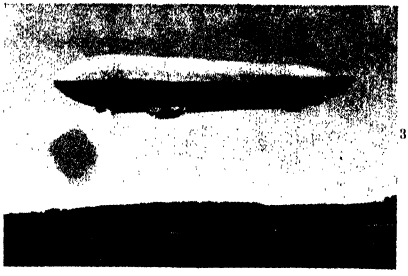
cal flying devices and, in 1500, made designs for "an aerial screw-machine 96 feet in diameter, to be built of iron, with bamboo framework covered with starched linen." The next century was one of much experimentation and prolific theorising; one of these paper-valiants was Bishop Wilkins, of Chester, who in 1672 looked for an early realisation of the problem of flight. In 1670 an Italian Jesuit of the name of Francis Lana first published a project, in which he proposed to rise in the air by the aid of four copper balls from which the air had been exhausted to form a vacuum. Some specific details are extant of an airship devised in 1709 by a Brazilian monk, Bartholomew de Guzmão, but which never flew; in 1766 a Doctor Black, and in 1782 an Italian named Cavallo, were also actively at work in trying to solve aerial navigation; whilst there is also record of the success of Degen, a Viennese clockmaker, who in 1809, "flew in several directions with the celerity of a bird at a height of 54 feet above the ground," and the next year Mr. Walker, of Hull, devised a wooden machine with lever-worked wings, the specification and drawings for which can be seen at the Patent Office in London. A few years earlier, in the year 1783, a new departure took place, when the brothers Stephen and Joseph Montgolfier introduced the balloon, which thus overcame the great obstacle to aerial navigation, and brought the problem much more within the reach of practical skill. Their balloon was 110 feet in circumference, rose to a height of 6,000 feet and travelled horizontally a distance of 7,668 feet. The balloon was filled with hot air made by burning chopped straw and wood. The next experimental balloon carried a car, in which were a sheep, a cock, and a duck, which, proving successful, induced M. Pilatre de Rozier and the Marquis d'Arlandes to ascend over Paris in a balloon 45 feet in diameter and 75 feet high. The balloon attained an altitude of over half a mile, and ballast was employed for the first time. The first gas-inflated balloon was invented by Professor Charles, which ascended in December, 1783, from the Tuileries. [*See* AEROSTAT.] Mr. J. P. Blanchard (1784) was one of the first to recognise the possibilities of mechanical wing-movement in combination with a gas-sustained balloon, but M. Henri Giffard, the inventor of the locomotive injector, in 1852 made the first practical attempt to utilise the screw for balloons, and may be considered as the inventor of the most promising of the early dirigibles, as Mr. Henson ten years earlier can justly claim the credit for the first approximation to the aeroplanes (q.v.) of to-day. The envelope of the airship was 150 feet long by 40 feet central diameter, contained 88,000 cubic feet of gas, and was driven by a 3 h.p. steam engine weighing 3 cwts. It ascended 6,000 feet, was readily steerable, and attained a speed of seven miles an hour.

M. Dupuy de Lôme in 1872 made a successful ascent at Paris in an elongated shaped balloon, and accomplished a journey of 90 miles in a little under three hours. The motive power was manual, four men operating a revolving fan with satisfactory results.

In England somewhat earlier (1862) the highest ascent ever made, before or since, was accomplished by Messrs Glaisher and Coxwell, who recorded a height of seven miles from the earth. After making mention of the 150 feet long dirigible balloon of MM. Renard and Krebs, which in 1884 described a circle 4½ miles in circumference in the air near Paris in 23 minutes, we pass to the last decade of the nineteenth century, which was to see striking advances in aviation along both lines of development, dirigible balloons and aeroplanes, which latter are dealt with separately. [AEROPLANES.] During that time Sir Hiram Maxim produced his aeroplane (1894) and Senor Santos-Dumont his series of dirigible balloons or aerostats (q.v.). Dumont, it will be remembered, circled the Eiffel Tower, Paris, in October, 1901, with his "No. VI." airship. In Germany, during nearly the whole of the decade mentioned, Count Zeppelin had been experimenting, and in 1900 surprised the world with his first famous airship. His subsequent vessels and their exploits, including the 950 mile flight in 1909, will be common knowledge. It may be interesting, however, to learn that Count Zeppelin built his aerostat with rigid frames of aluminium, on which rubbered cloth was stretched to form the body, and inside this were a number (17 in the latest) of *ballonets*, or small balloons. The latest *Zeppelin* is of







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AERONAUTICS.

1 Latham's Monoplane. 2 Farman's Biplane. 3 The Zeppelin Dirigible Airship. 4 Wright's Biplane. 5 Roe's Triplane. 6 Bleriot's Monoplane.

enormous length—453 feet, or nearly as high as the London Monument and St. Paul's Cathedral on the top of one another. In England the *Nulli Secundus* was built in 1907, and wrecked in October of that year after a flight over London. It was of the gas-bag type, non-rigid, and was 111 feet 6 inches long with steel frame and car, and an 8-cylinder 40-50 h.p. motor, driving twin propellers. The latest British airship was first called *Baby* in 1909, when it was 100 feet long, but by the time it flew from Aldershot over London and back—80 miles—in July, 1910, it had been rechristened the *Beta*, had been lengthened to 120 feet, and fitted with new engines. [*See* BALLOONS.]

The United States first dirigible is 96 feet long, and can fly at 19·61 miles an hour. Each of the more important Powers have a number of airships built or building. In substance the plan is the same. The large gas envelope contains an inner *ballonet* in which is air, so that as gas is lost more air can give greater capacity to this inner envelope. These envelopes are only maintained in extension by inflation, except in the *Zeppelin* type and the semi-rigid *Gross* (also German). By steel wires or other means a car is suspended below the envelope, and this contains the aviator and assistants as well as the motors. The propellers extend horizontally from the car, as also do the rudders, which are usually of rubbered cloth on a wooden or steel frame. Dirigible balloons and aeroplanes have both been adopted by various Powers as possible adjuncts to offensive and defensive operations. The 1909-10 estimates for Great Britain included £78,000 for airship experiments and accessories, and similar activity is shown by other Great Powers.

Aerophor, an apparatus used in Germany for distributing moisture in the form of a very fine water-cloud. In factories where the manufacture of textile fabrics is carried on it is essential that the air should be continually and equably moist, a state which the *aerophor* secures mechanically by—1, inducing a constant air-current; 2, by diffusing water into the atmosphere in the form of an almost imperceptible spray. It will project only such particles of water as can be absorbed immediately.

Aeroplane, a flying machine in which the gas-filled bag is dispensed with, and flight attained solely by mechanical means. These heavier-than-air machines are divided into—monoplanes (with only one flying (aero) surface), biplanes (having two main planes), triplanes (three main planes), helicopters (having a number of small revolving planes, without any large sustaining surface). Some of the earliest experiments with aeroplanes are referred to under AERONAUTICS and AERODROME. After these came those of the famous Wright Brothers, who produced their "gliders" (aeroplanes without engines) in 1900 and 1901 and their first aeroplane with motor power in 1903. This was a biplane; of similar construction was the machine on which the Hon. C. S. Rolls flew from Dover to Calais and back in June, 1910, and which he was using when he was killed in the following month. It was on a biplane, also, that M. Paulhan won the £10,000 prize for the flight from London to Manchester (184 miles) on the 28th of April, 1910. Biplanes have each plane directly above the other with the motor and the aviator between them, the average length of each plane being 40 feet. The British Army aeroplane is of this type. The monoplane type has its plane divided into two wings. The machine in which M. Blériot flew the Channel in July, 1909, is of this type, and its wings are each 14 feet long. The propeller is in front, and its action is to draw the machine along rather than propel it. The aviator sits between the wings, where also the motor is situated. These two forms are the leading types of aeroplanes, and a glance at the page of illustrations will reveal the differences in appearance. The principle of aeroplanes is that there should be a sufficient aero surface, provided by the supporting planes to enable the machine to "lift," to maintain itself in the air, and, when sufficient motive power is applied to overcome air resistance, to make flight. The problem of equilibrium and dirigibility is dealt with by vertical and horizontal "rudders." In the case of the Wright biplane a system of flexing or curving the ends ("tips") of the supporting planes is added. The biplanes of the U.S.A. Government, *June Bug* and *Silver Dart*, are somewhat distinctive inasmuch as their sustaining planes are arched, and curve towards each other at either end.

Aerostat is the original name by which the balloon was known. It was used in 1783 when "the first aerostat filled with inflammable air (gas) ascended from the Tuileries." It has been largely used of late as a synonymous term with "dirigible balloons," Count Zeppelin's airship frequently being so described.

Aerostatic Press, the name given to a machine for utilising the pressure of the atmosphere for extracting the colouring-matter from dye-woods and for other purposes. The machine is divided into two parts by means of a horizontal partition, upon which the matter from which the extract is to be obtained is laid; the partition is perforated with small holes, and a perforated lid fits over it. The liquid which is to extract the colouring-matter is then poured on the top, and the air extracted from the lower portion of the vessel by means of an air-pump, and by atmospheric pressure the extracting liquid is forced through the substance, carrying with it the required colouring-matter.

Aerostatics, that branch of statics which treats of the force-relations of air or other elastic fluids, when the force-relations are such that equilibrium results. [AERODYNAMICS.]

Æschines, the famous Athenian orator and rival of Demosthenes, born *circa* 389 B.C. After fighting at Mantinea he entered on a political career. He went on an embassy to Philip of Macedon, and subsequently—or perhaps before—advocated peace with that monarch. Demosthenes accused him of receiving bribes, and he retaliated by charging Ctesiphon with illegally proposing to

confer on his rival a golden crown. Demosthenes delivered his most famous oration in defence of himself and his friend, with the result that Æschines was exiled. He is said to have established a school of oratory at Rhodes, and afterwards to have lived in Samos, where he died in his 75th year.

Æschylus, the earliest and greatest of Greek tragedians, was born in 525 B.C. He took part in the defeat of the Persians both at Marathon and Salamis, and his play entitled the *Persæ* is a glorious monument of this momentous struggle. He wrote seventy tragic dramas, all highly successful, of which only seven have come down to us. It would seem that he was opposed to the democratic principles of the Periclean era, and retired to Sicily, dying at Gela in his sixty-ninth year. Some attribute his expatriation to jealousy of Sophocles, who carried off the prize for tragedy in 468 B.C. His style, though obscure and sometimes harsh, possesses a stern, majestic eloquence to which no other Greek dramatist can pretend, and he was evidently inspired with a deep religious feeling and a sense of the highest duties of a national poet.

Æsculapius (Gr. Asklepios), son of Apollo and the nymph Coronis, though others assign to him a different origin, was educated in the healing art by the Centaur Chiron. For his impiety in restoring Hippolytus to life Zeus destroyed him with a thunderbolt, but he was admitted to heaven and became the god of medicine. In this character he had many shrines in Greece, the grandest being at Epidaurus, where his effigy represented a bearded old man bearing a knotted stick entwined by a serpent. Hygieia was reputed to be his daughter. The cock, the raven, and the goat were sacred to him.

Æsculin ($C_{15}H_{16}O_9$), a substance obtained from the bark of the *horse-chestnut* (*Æsculus hippocastanum*) in the form of needle-shaped crystals, which are colourless, inodorous, and bitter to the taste. Æsculin is only slightly soluble in water and alcohol at ordinary temperatures, but dissolves more freely at a boiling heat. Glacial acetic acid is also a very good solvent; but by ether it is scarcely affected. Æsculin is celebrated for the beautiful blue fluorescence which is shown by its aqueous solution, a characteristic which becomes still more marked if the liquid be alkaline, but is destroyed by acids.

Æsop, the accredited author of the celebrated fables, was born about 619 B.C., probably in Phrygia. He came to Athens as a slave, and was manumitted by Iadmon of Samos. According to Plutarch he visited the court of Crœsus and rebuked Solon for his arrogance. The Lydian king sent him to Delphi with a large sum of money to distribute, but as he did not execute his mission to the satisfaction of the Delphians, they killed him, 564 B.C. Though antiquity is clear as to his having been the author of fables, none of them are extant, and it is impossible to trace his work amongst the productions of his numerous imitators.

Æsthetics, a term of somewhat vague meaning, owing to the different significations with which it has been applied. Kant and his followers understood by it the science which treats of perception by the senses, thus keeping close to the original Greek derivation. In 1750 the German philosopher Baumgarten limited it to denote the science of the Beautiful, and this is now its commonly accepted meaning. Again, within the last few years the words æsthetic, æsthete, etc., have been used in exclusive connection with a certain type of "sentimental archaism."

Æsthetics, regarded as the science of the Beautiful, or of the principles of art and taste, proceeds by two fundamentally distinct methods, the metaphysical or *a priori*, and the scientific or empirical. The first starts with assuming that beyond the material world lies some ultimate conception which is more or less embodied in different forms of beauty, and seeks by means of this conception to determine deductively what it is that constitutes beauty. The scientific method compares and classifies recognised phenomena of beauty and art, and endeavours by so doing to establish certain laws. It should be remembered, however, that most writers on æsthetics have treated the subject as part of a philosophic whole, the principles of which it is first necessary to grasp. The science of the Beautiful also includes the determination of the laws and nature of the Sublime, and the Ludicrous, and much has been written on their mutual relations, especially as regards the Ludicrous. Psychologically considered, the Beautiful is a source of pleasure which presents unity in diversity, and so is easy of apprehension. Any trait which entails conflict, or difficulty of apprehension, jars, and turns the pleasure into pain. Artistic pleasure, therefore, springs largely from harmony. Lessing lays stress on this principle in his *Laokoon*. "Among the ancients," he says, "beauty was the highest law of the plastic arts. And this, once proved, it is a necessary consequence that everything else over which their range could be at the same time extended, if incompatible with beauty, gave way entirely to it; if compatible was at least subordinate." The power of association in æsthetic feeling is too well known to need dilating upon, and the whole question is greatly complicated by the fact that not only the associations of the individual, but those of the race must be considered.

Æstivation (from the Latin *æstivus*, belonging to summer"), the term applied in botany to the folding of the floral leaves, or sepals and petals in the flower-bud, such buds being mostly produced in summer. It is a character of importance as serving to distinguish some of the natural orders of flowering plants. The folding or rolling of the leaves individually, and their collective arrangement have to be separately considered. Individually they may be *reclinate*, their apex folded to their base; *conduplicate*, their two sides folded together; *plicate*, folded like a fan; *convolute*, rolled up from one side, like a scroll; *involute*, with their margins rolled inwards or upwards; *revolute*, with the margins rolled backward; *circinate*, rolled up from

apex to base, as in the petals of *Hamamelis;* or *crumpled*, as in those of poppies. Collectively they may be *valvate*, meeting at the edges without overlapping, as in the sepals of *Clematis* or of the *Malvaceæ* and the petals of the vine (*Vitis*); or *imbricate*, overlapping one another. Among varieties of imbricate æstivation, the chief is that known as *contorted*, where one edge of each leaf is rolled over the next, as in the petals of *Malva*.

Aëthrioscope, an instrument for determining the radiation against the sky. It was invented by Sir John Leslie, and consists of a differential thermometer, whose bulbs are protected by a metallic cup, one of the bulbs being in the focus of the highly-polished interior.

Ætolia, a mountainous and woody country of ancient Greece, having the Gulf of Corinth as its S. boundary, and separated on the W. by the river Achelous from Acarnania. Fertile plains stretch along the coast and the banks of the Achelous. The population was wild, treacherous, and uncivilised, but courageous and patriotic. During the palmy days of Greece they played no important part, but the Ætolian League held out long against Philip of Macedon and the Achæan League. The Ætolians joined the Romans against Macedon, but subsequently turned against their allies, and were completely subdued by Æmilius Paullus. Ultimately their country was merged in the province of Achaia. Before the disruption of the Greek Empire, Theodorus Angelus established a dynasty in Ætolia and Epirus, which lasted till 1432, when the Turks put an end to it. George Castriot, known as Scanderbeg, struggled for a time against Mohammedan supremacy, but the country was reduced by Mohammed II. It now forms part of the kingdom of Greece.

Aëtomorphæ, a group of carinate birds, equivalent to the Raptores or Accipitres of older systematists. [BIRDS, BIRDS OF PREY.]

Affidavit, a solemn statement of a fact or facts known to or believed by the person making it, and attested by the oath of such person made before some person authorised to administer an oath, and according to the faith of the deponent. In England, and with Christians, on the Holy Gospels. Affidavits are also necessary in many cases to show that certain formalities have been observed, as in bankruptcy and probate. Formerly, an oath was always indispensable in affidavits, but Quakers, Moravians, and Separatists have long been privileged to make a solemn declaration or affirmation, in lieu of an oath. [AFFIRMATION, DECLARATION, and OATH.] Affidavits abroad are usually made before the British Ambassadors or consuls. In England there are commissioners specially appointed, usually practising solicitors, for the purpose of administering oaths. Affidavits in all the English courts must be made and expressed in the first person.

Affiliation, or FILIATION, the term applied to a magistrate order in England on the putative father of a bastard for maintenance. The term is also applied to an action in the Sheriff's Court of Scotland by the mother of a natural child for its support from the reputed father. The rates of maintenance vary in different districts. The father's liability may be enforced by imprisonment. [BASTARDY.]

Affinity (*Legal*), in contradistinction to consanguinity, the term denoting the relationship brought about by marriage between the husband or wife and the blood relations of either. But this relationship is personal to the husband and wife respectively, and does not extend so far as to bring into affinity the blood relations of one with those of the other: thus a wife's sister has no affinity with her husband's brother.

Affinity, in *Chemistry*, the force in virtue of which substances are enabled to combine together and produce a compound which cannot be destroyed by mechanical means. The fact that the action of this force is always attended by a development of one or more forms of energy, as *heat*, *light*, or *electricity*, points to the probability that chemical affinity is itself a variety of energy.

Affirmation, or DECLARATION, a statement which is now substituted for an oath in cases of those whose conscientious scruples prevent them from taking an oath, as Quakers, Moravians, or atheists. If made before the proper authorities, a court of law or commissioners, the affirmant is, in case of false statement, liable to the same consequences as if he had taken an oath thereto. [AFFIDAVIT, OATH.]

Afghânistân, an Asiatic country, bounded by India on the east, Persia on the west, Baluchistan on the south, and the River Oxus and the Russian possessions in Central Asia on the north. It has an area of about 270,000 square miles, and a population estimated at about five millions. One of the most gigantic mountain ranges of the world—the Hindu Kush, an offshoot of the Himalayas — overspreads the greater part of Afghânistân. The temperature thus varies from extreme cold in the highlands to the most intense heat in plains, such as those of Jelalabad, Candahar, and Seistan. The monsoon which deluges India has scarcely any effect beyond the Suleimân range, the eastern limit of the Afghân plateau. Mineral wealth is believed to be abundant in the northern and eastern parts, iron, lead, copper, antimony, and other metallic ores, sulphur, and several of the earthy alkaline and metallic salts being met with in greater or less abundance. Gold in small quantities is brought from Candahar, the Laghman Hills, and Kunar. Badakshan is famous for its rubies and lapis-lazuli. The ordinary domestic animals, such as the horse, camel, cow, buffalo (occasionally), sheep, goat, etc., constitute the main wealth of most of the Afghâns; while several of the wild animals, such as the wolf and fox, are hunted and trapped for the sake of their furs. The principal towns are Cabul, Herat, Candahar, Ghazni, Jelalabad, Maimana, Saripul, Mazar-i-Sharif, and Balkh.

Cultivation is of two kinds, *abi* and *lallam*, the latter being dependent solely on rain, and the

former on irrigation above or below ground (*karez*). Fruits, including the apple, pear, almond, peach, quince, plum, pomegranate, grape, fig, melon, etc., are produced. In most parts of the country there are two harvests, one, consisting of wheat, barley, with some peas and beans, being sown at the end of the autumn and reaped in summer; while the other, which includes rice, arzun, millet, jowari, Indian corn, and the like, is sown at the end of spring and reaped in autumn. Cotton is found in the hotter districts; the castor-oil, madder, tobacco, and assafœtida plants are common, great quantities of the last being exported to India, where it is a favourite ingredient in cookery. Agriculture

GROUP OF AFGHÂNS.

is the principal employment. Owing to the normal state of unrest throughout the country, manufactures are unimportant, the more noticeable being the production of silks and felt (especially at Candahar), the manufacture of *postins*, or sheepskin coats, and dyeing. There is a good trade with Persia, through Herat; and an increasing trade with India, through Candahar and the Sind Pishin Railway in the one direction, and *viâ* the Khaibar and Gomul Passes in the other. The latter route is preferred by the Powandahs, or itinerant merchants, who move about with their flocks, and act as carriers of goods between Afghânistân and India. They import carpets, furs, woollen, silks, drugs, dyes, and dried fruits, and descend into the plains of the Punjab, leaving their families in charge of the camels, flocks, and herds, while the Powandahs themselves travel far over India to dispose of their goods. They are subject to endless exactions, attacks, and robbery from the border tribes, more particularly the Waziris; and the vitality of this ancient traffic, in spite of such discouragements, is very remarkable. The imports into India also include horses, madder (*manjit*), fruits, *ghi*, and raw silk. In return the Afghans receive cotton goods, indigo, sugar, and tea. Such trade as exists is carried on under great difficulties, there being no made roads, and, generally speaking, nothing being done to facilitate communication. The rivers are not bridged; and it is only when a route becomes absolutely impassable that it is repaired, and then only by travellers for their own convenience.

Afghânistân forms an ethnological area of a highly complex character, the chief elements being —1. The politically dominant *Afghâns* or *Durani* belong to the Iranic branch of the Aryan family, centred chiefly in the Cabul, Arghandâb, and Helmand basins, and in the Suleimân highlands, numbering about 1,000,000, though the *Ghilzais*, of Turkish origin, who form the military and commercial sections, are rather more numerous, being well over 1,000,000. 2. The *Tajiks*, also Iranians of the Persian branch, forming agricultural and also trading communities in the more fertile districts; about 1,000,000. 3. The *Hindkis—i.e.* Hindus, chiefly traders, and numerous, especially in the eastern districts; about 500,000. 4. The *Hazaras* and *Aimaks*, of Mongolo-Tatar stock, now speaking Persian, in the northern highlands between Bamian and Herat; 600,000 to 700,000. 5. The *Kataghâns*, or Uzbeks, forming the bulk of the population in Afghan Turkistân; 200,000. 6. The *Badakshi* of Galcha (Eastern Iranic) stock, in Badakshân, 100,000; the *Kohistani* and *Siahposh Kafirs*, also Galcha stock, in Kohistân and Kafiristân; 120,000.

The Afghâns speak Pushto, but in diplomatic

correspondence, they employ the more refined Persian. They are Mohammedans of the Sunni sect, and this is a chief ground of their hereditary hatred of those Persians who belong to the Shiah sect. Although loosely united under one Amîr, they do not constitute a homogeneous nationality, but are split up into a multiplicity of more or less hostile tribal groups, of which the more powerful are the Durâni, to which belongs the reigning dynasty; pop. 800,000; the Ghilzais, 600,000; the Yusafzaes, 600,000; and the Waziri, 250,000. They are physically of a somewhat coarse, vigorous type, with regular features, swarthy complexion, and an occasional Jewish cast of expression, which lends some colour to their claim to the title of "Bani-Israel," or "Sons of Israel." The name Afghân has been connected with the Açvaka of the Mahâbhârata. Another national name is *Pakhtûn*, whence the form *Pathân*, by which they are commonly designated in India.

The government is a military, aristocratic, and despotic republic. Religion is the counterpoise to his authority, which gives the clergy, or "mullahs," great influence. The dominions of the Amîr are politically divided into the four provinces of Cabul, Turkistân, Herat, and Candahar. The districts of Badakshân and Wakhan have recently been merged into that of Turkistân. In Shere Ali's time the revenue of the country was estimated at £712,968 a year, the government demand varying from a third to a tenth. At the end of 1909 the revenue was returned as £600,000. The army is said to have been founded by Shere Ali.

The whole of Afghânistân was conquered by Timur, Cabul remaining in the hands of his descendants, and Candahar being added to it by Sultan Babar in 1522. Nadar Shah, the Persian, held the Afghan provinces till his assassination in 1747, after which they were formed into a single empire under Ahmed Shah. The latter part of the century was marked by a series of internal wars, till the news that the Emperor Napoleon and the Czar had agreed upon an expedition to India through Persia resulted in the despatch of Mr. Elphinstone to Cabul. A treaty was concluded with Shah Shujah, the ruler of Afghânistân, at Peshawur, in 1809. His rule, however, proved unpopular, and he was dethroned in favour of Mahmud Shah. In 1837 Mahomed Shah, ruler of Persia, encouraged, as it is said, by Russia, laid siege to Herat, the defenders being assisted by Lieutenant Pottinger. The British determined to restore Shah Shujah to the throne of Cabul, and in 1839 took possession of Candahar, and Shah Shujah was crowned. Ghazni soon fell, and the Anglo-Indian army entered Cabul. Frequent insurrections, however, soon arose, culminating in the serious revolt of the winter of 1841–2. In January the British division was practically annihilated, but this was avenged in General Pollock's expedition the same year, and the British army returned in triumph to India. In 1863 Dost Mahomed became master of Herat, but he only lived thirteen days afterwards, and was succeeded by his son, Shere Ali Khan. His reign was most troublous, and internal wars with the chief princes were incessant. In 1878, when the relations between Russia and Great Britain were strained, Shere Ali made overtures to Russia, whereon Great Britain declared war, which did not really cease till 1880, when Sir F. (now Lord) Roberts totally defeated Ayub Khan in August, and the British forces were withdrawn to Quetta. Abdur Rahman died in 1901, and was succeeded by his son, Habibulla Khan.

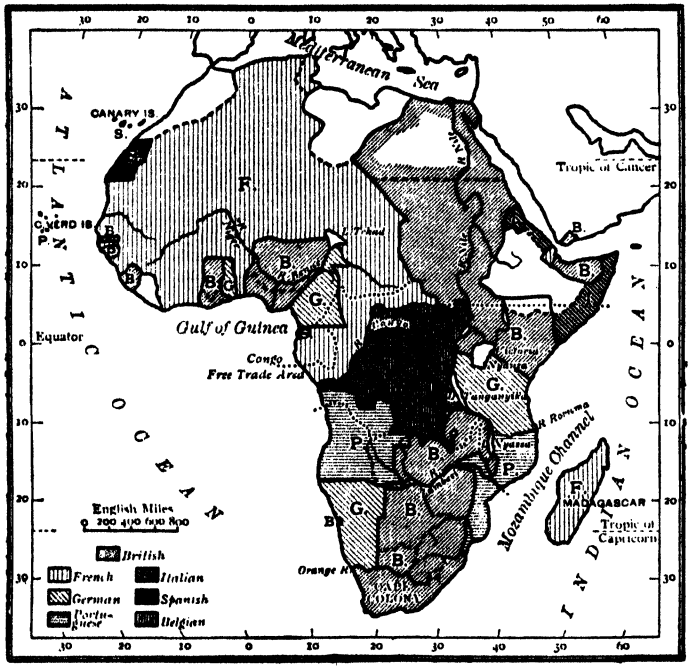
Among the more important of recent political events may be mentioned the treaty arranged in 1893, and signed in Cabul in 1905, which provided for the foreign affairs of the country being controlled by Great Britain, whilst the internal affairs remained in the hands of the Amir, Great Britain, further, to protect the country against foreign aggression. Certain boundary delimitations on the Persian frontier were settled in 1903-5, and in 1907, by an Anglo-Russian agreement, Great Britain undertook to annex no portion of Afghanistan territory.

Afium-Kara-Hissar, a city of commercial importance, 200 miles E. of Smyrna, in the pashalic of Anatolia. It is a mart for opium and local manufactures.

Africa. *Extent, Configuration, Islands.*—Africa is a continent, smaller than Asia and America, about three times larger than Europe, with area 11,950,000 square miles, including the islands, and population vaguely estimated at from 200 to 220,000,000, or from 16 to 18 inhabitants to the square mile. Geographically Africa forms a south-western peninsula of Asia, with which it was connected from remote ages by the Isthmus of Suez till the year 1869, when that narrow neck of land was pierced by a navigable canal. In form, as in position, it is intermediate between the two other southern continental masses, being of irregular triangular shape; in its outlines less monotonous than Australia, less diversified than South America, and, like the latter, tapering from its base north of the equator to its apex in the Austral seas. The distance between the extreme northern and southern points, Cape Blanco (lat. 37° 19′ 40″ N.) and Cape Agulhas (lat. 34° 51′ 15″ S.) is nearly the same as between the extreme eastern and western points, Cape Guardafui in the Indian Ocean (long. 51° 14′E.) and Cape Verde in the Atlantic (long. 17° 32′ W.), nearly 5,000 miles one way, over 4,500 the other. But owing to its generally uniform contours, with no gulfs or inlets penetrating far into the interior, except Cabes and Sidra on the Mediterranean, and with but few bold headlands, such as Capes Bon and Blanco on the north, Verde and Lopez on the west, Good Hope on the south, and Guardafui on the east side, the total coast line is little over 15,000 miles, or 4,000 miles less than that of the much smaller but far more varied continent of Europe. There is also a remarkable absence of islands: scarcely any on the northern and southern seaboards, none in the South Atlantic except the islets of Annobon, Ascension, St. Helena, and Tristan d'Acunha; none in the North Atlantic except the Madeira, Canary, Cape Verde, and Bissagos groups, with Fernando Po and one or two other volcanoes in the Gulf of Guinea; in the Red Sea, Perim, Dahlak and other coralline reefs; in the

Indian Ocean, Socotra, Pemba, Zanzibar, and Mafia, near the coast, besides the great island of Madagascar with the surrounding Comoro, Seychelles and Mascarenhas groups, apparently dependencies or remnants of a now submerged continent of "Lemuria."

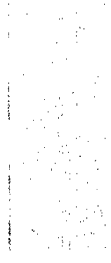
Physical Features.—Africa is the most elevated of the continents, for although the mountain systems are generally less lofty and less developed than elsewhere, the land stands at a higher mean level above the sea—3,000 to 4,000 feet in the south, 1,200 to 1,300 in the north, average 2,200, several hundred feet more than Asia, the next highest.



MAP OF AFRICA, SHOWING THE DIFFERENT POSSESSIONS OF THE EUROPEAN POWERS.

The surface is thus disposed in two vast plateaux at two different levels, with an outer rim or escarpment, leaving a relatively narrow zone of low-lying coastlands between the uplands and the sea. This escarpment, somewhat low and even effaced on parts of the north-east and west sides, is more elevated and often disposed in terraces on the other sides, where are developed the lofty Nieuweveld and Drakea (8,000 to 10,000 feet), flanked by the lower Zwarte and Lobombo ridges in the south and south-east; the Namuli, Nyassa (Livingstone), Usagara, Masai (Aberdare), Kaffa and Abyssinian highlands stretching along the east side from Mozambique to the Red Sea (6,000 to 15,000 feet) and culminating in Kenia (18,620 feet) and Kilima-Njaro (19,780 feet); the Atlas system in the extreme north-west (8,000 to 12,000 feet); the Cameroon, Angolan, and Damara coast ranges on the west side (6,000 to 13,500). In the interior there are no extensive mountain systems, but only disconnected or isolated chains, such as the Tibesti range (5,000 to 8,000) in Central Sahara; the Jebel Marrah (4,000 to 6,000) in Dar-For; Mfumbiro (10,000), and Ruwenzori (20,000 ?) in the equatorial lake region; the unexplored Lokinga (Mushinga) range forming the divide between the Congo and Zambesi basins.

Geology.—In its geology Africa presents the appearance of great antiquity, the more primitive plutonic and sedimentary rocks mostly prevailing over the more recent corresponding formations. Thus late eruptive rocks and still active volcanoes are mainly confined to the Cameroons and adjacent islets on the west; and on the east side to a line of volcanic disturbance extending from the Comoro group in the Mozambique Channel through Masailand and the east slopes of Abyssinia northwards to one or two volcanic islets in the Red Sea. Syenites, old sandstones, and nummulitic limestones prevail throughout the Nile basin; in Abyssinia the old limestones are associated with dolerites and trachytes resting on a granite basis; the sands of the Sahara are not of recent marine origin, as has been supposed, but have mainly resulted from the weathering of quartz, carboniferous limestone, and very old sandstones; crystalline rocks, granites, gneiss, and sandstones are widely diffused throughout



Sudan; granites and auriferous quartz crop out in Upper Guinea, and are intermingled in Kordofan with porphyries and syenites; basalts, crystalline quartzites, limestones, shales, clay slates and other metamorphic rocks, red and other sandstones are characteristic of the Mauritanian (Atlas) region. The metamorphic rocks of the Congo basin are separated by the alluvial plains of the Zambesi from the granites and crystalline slates underlying the fossiliferous rocks of the Orange basin and terrace lands (Karoos) of the extreme south. The most widely diffused minerals are gold (Upper Guinea, Nubia, Matabele Land, Transvaal); copper (Congo and Welle basins, Namaqualand, Dar-Fertit); iron (Transvaal, Makaraka Land, Morocco, and many other regions); salt (Sahara); diamonds (Vaal basin).

Hydrography.—Both extra-tropical regions are poorly watered, each with an almost rainless zone (Sahara and Kalahari Deserts), and almost destitute of navigable rivers. From the Senegal on the Atlantic to the Juba on the Indian Ocean there is not a single perennial navigable stream except the Nile, and the Nile itself is joined by no affluent north of the Atbara confluence many hundred miles above the delta. The Igharghar, Messawara, and other copious watercourses, which in quaternary times intersected the now arid Sahara in various directions, have disappeared, and the oases of this region, as well as large tracts in Mauritania, depend for their supplies on underground reservoirs. Even the Baraka, chief affluent of the Red Sea, reaches the coast only during the rainy seasons. So also in the south, the only important streams beyond the Zambesi are the Limpopo flowing to the Indian and the Orange to the Atlantic Ocean, and the former alone is navigable for a short distance above its mouth.

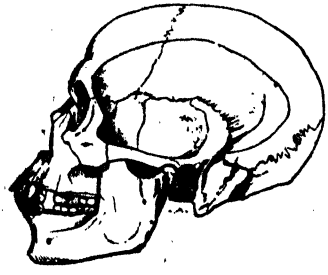
But the inter-tropical zone, comprising four-fifths of the continent, is one of the most abundantly watered regions of the globe. Here is the island-studded Lake Chad, occupying an extensive area of inland drainage in Central Sudan and fed by the copious rivers Shari from the south and Komadugu from the west. Here are the vast equatorial lakes Victoria Nyanza, Albert Nyanza, and Albert Edward, which with Lake Tsana in Abyssinia drain through the Nile to the Mediterranean; Bangweolo and Tanganyika, which discharge through the Congo to the Atlantic; Nyassa, which sends its overflow through the Shiré to the Indian Ocean. The four great arteries of the Congo, Nile, Niger-Benue, and Zambesi have a collective drainage area of nearly 5,000,000 square miles; and the Congo with its great affluents, Mobangi-Welle, Aruwimi, and others on the right bank, Kwango-Kassai-Sankuru on the left, presents many thousand miles of navigable waters. But all the main streams, as well as many other African rivers (Senegal, Ogoway, Cunene, Orange, Limpopo), are still entangled in the intricacies of the plateaux and obstructed by falls on their lower or middle courses. Smaller coast streams with separate catchment basins are numerous, especially on the seaboards of Senegambia, Upper Guinea, Cape Colony, and Zanzibar. But relatively to the extent of their basins few of the watercourses are copious, and the Congo, which in this respect ranks next to the Amazons, has a volume probably equal to the collective discharge of all other African rivers.

Climate.—Despite its greater mean altitude, Africa is the hottest of the continents. Nevertheless, the hottest parts are not those lying on or about the equator, but those extensive tracts that are farthest removed from the influence of the surrounding seas, and are at the same time destitute of lofty mountain ranges. Such are the arid waterless plains of the Sahara and its eastern extensions, the Libyan and Nubian deserts. But owing to the dryness of the atmosphere, these regions are far more healthy than the cooler but moister fluvial valleys, the low-lying coastlands, the Mauritanian "shotts," and other swampy tracts where malarious fevers are endemic. In the stony and sandy wastes sultry days are followed by cool nights, caused by the rapid radiation of the solar heat, and in the northern parts of the Sahara snow falls occasionally and stagnant waters are covered with a film of ice. Yet the glass rises in this region to 120° Fahr. in the shade, while the normal temperature is not more than 70° Fahr. at the northern and southern extremities of the continent. Speaking generally, these two extra-tropical regions, comprising the Mediterranean seaboard and the Cape lands, together with parts of the Masai and Abyssinian uplands and of the equatorial lake districts, are thoroughly salubrious and adapted for European colonisation. The white race has already been acclimatised without difficulty in the extreme north and south, but elsewhere probably not more than one-tenth of the land is suitable for permanent settlement. In the northern zone dry trade winds prevail throughout the year, interrupted in Mauritania by winter rains, and here also have their origin the pestilential simooms or hot winds, accompanied by fierce sand storms, which are known as the harmattan in the west and khamsin in the east, and which, crossing the Mediterranean, reappear under the name of the sirocco in Italy and as the föhn in the Alpine valleys. In the inter-tropical region the moisture-bearing clouds follow the course of the sun, which in combination with the oceanic monsoons gives rise to a double rainy season on the east and west seaboards, and to permanent rains on and about the equator.

Flora.—This continuous rainfall, though not excessive (normally 50 to 60 inches, seldom anywhere exceeding 100, and at Wadelai on the White Nile falling to 42), suffices to support in the Gaboon and many parts of the Congo basin, as in Manyuema and the Aruwimi valley, an exuberant forest vegetation comparable to that of the Amazon's basin itself. On the plains about the Congo-Nile waterparting the rivers disappear beneath a dense tangle of overhanging foliage, likened by travellers to long "galleries" following their winding course. But impenetrable forest growths, matted together by the coils of huge lianas, are by no means the dominant feature of the African flora. In fact, the forest zone proper is chiefly confined to the region between the great lakes and the west coast, and to the slopes of the Atlas, Abyssinian, and Masai

highlands. Woodlands cover probably less than 15 per cent. of the whole surface, which is elsewhere marked by the sharpest contrasts between the boundless grassy steppes of the plateaux, the cultivated corn-yielding plains of Sudan, and the sandy wastes of the northern and southern desert regions. The African flora is, on the whole, poorer in distinct species than that of the other continents. Thus the characteristic date, dûm, deleb, and oil palms are widely diffused in their respective northern and central zones; but the palm family itself is represented by ten times as many species in Asia and America as in Africa. Highly typical plants are the gigantic baobab (*Adansonia*), the ensete and kigalia of Sudan and Senegambia, the thorny and gummiferous acacias of the steppes, the papyrus, ambatch, and other graminaceæ of the Nile basin, the remarkable welwitschia of the arid southern districts. Mauritania, with its olives, chestnuts, conifers, cork-tree, and evergreen oaks, presents a transition between the South European and African floras, while the Cape lands form a distinct botanical zone, distinguished by a surprising variety of grasses, heaths, ferns, and flowering shrubs. Of cultivated and other economic plants the most valuable are wheat, durra, cotton, indigo, manioc, coffee (two varieties indigenous), maize, alfa grass, ground nuts, butter-tree, bananas, and date palm.

Fauna.—Owing to the absence of great mountain barriers the African fauna is marked by a certain degree of uniformity, many of the characteristic forms, such as the lion, leopard, hyæna, jackal, elephant, giraffe, buffalo, rhinoceros, ostrich, and some members of the antelope family, ranging almost from one extremity of the continent to the other. Amongst the most typical animals are the zebra and now extinct quagga of the south; the anthropoid apes (gorilla and chimpanzee) of the tropical forests; the widely-diffused cynocephalus (dog-faced baboon); the colobus and green monkey, the Dinka and Senegal cattle, koodoo, eland, gnu



SKULL OF A NEGRO.

and other antelopes, fennec (Egyptian fox); weaver-bird, balæniceps rex, secretary, ibis, flamingo, and guinea fowl; huge pythons and many venomous snakes; the locusts, termites, and still more destructive tsetse and donderobo flies, whose bite is fatal to most domestic animals. Of these, the commonest are the horse, the camel (introduced by the Arabs), the ox, goat, sheep, and poultry, and in non-Mohammedan countries the dog and pig.

Population.—The aboriginal inhabitants of Africa belong to two distinct stocks, the Hamitic and the Negro, and the great bulk of the population probably represent diverse interminglings of these two primitive elements. The proper home of the Hamites, who are themselves a branch of the Caucasic family, is the northern section of the continent from the Mediterranean to the Sudan. They form four main groups: *Berber* (Kabyle, Shluh, Tuareg, etc.) in Mauritania ("Barbary" States) and the western Sahara; *Tibbu* (Teda, Dasa, and others) in the eastern Sahara; *Egyptian* (Copts, Fellahîn) in the Lower Nile valley; *Ethiopian* (Beja, Afar, Agau, Galla, Somali) generally east of the Middle and Upper Nile from Egypt to the equator (Nubian Steppes, Abyssinia, Somal, Kaffa and Galla lands).

HOTTENTOT.

Of the early European and Asiatic immigrants (Greeks in Cyrennica and Lower Egypt, Phœnicians, Romans, and Vandals in Mauritania) all have disappeared, leaving but doubtful traces of their presence, chiefly amongst the Berbers of Algeria. Of later European immigrants the most numerous are the Greeks, Italians, Spaniards, and French along the Mediterranean seaboard from Egypt to the frontiers of Morocco; the English and Dutch (Boers) in the extreme south. Most of the so-called Portuguese are half-castes, and all the French Huguenots of the Cape had already been absorbed by the Dutch before the British occupation.

Geographical Exploration.—Since about the middle of the 19th century geographical discovery has progressed at a rapid rate. Little had been done before that time to enlarge our knowledge of the continent except by James Bruce, discoverer of the source of the Blue Nile (1770); Mungo Park and the brothers Lander in Senegambia and the Niger basin (1795-7; 1806; 1830), Clapperton in Central Sudan and Sahara (1822); Gobat, Krapf, and Rebmann in East Africa and Abyssinia (1830-52); Du Chaillu, in the Ogoway and Gaboon basins (1850). Then followed with little intermission the memorable explorations of Livingstone in South Central Africa, lakes Nyassa, Bangweolo, Ngami, etc. (1849-73); Barth, Richardson, and Overweg in Central and West Sudan (1850-55); Burton and Speke, lakes Tanganyika

and Victoria Nyanza (1857-8); Speke and Grant, lake Victoria and White Nile (1860-62); Baker, Albert Nyanza (1863-5); Schweinfurth, White Nile and Welle (1868-71); Nachtigal, Central Sudan (1869-74); Cameron, South Central Africa (1873-5); Stanley, circumnavigation of Lake Victoria, Lake Alexandra, Lualaba-Congo (1875-77); Serpa Pinto, Benguela to Natal (1877-79); Pogge, Wissmann and Wolf, Congo basin (1881-86); Junker, Libyan Desert, Makaraka Land, Welle-Makua basin (1875-86); Grenfell and Van Gele, Congo basin, Ubangi river (1885-6; 1888); Joseph Thomson, Masai Land (1884); Fischer, Lake Baringo (1885-6); Count Teleki, Lake Samburu or Rudolf (1887); Stanley, Aruwimi basin, Ruwenzori mountains, Lake Albert Edward, Semliki river, etc. (1887-89); Decœur and Alby, Niger (1894); Baud, Niger (1895); Botego, Lake Rudolf (1895); Foureau, Ahaggar (1897); Bonnin, Upper Senegal (1897); Gibbs and Law, Nyassaland (1897); Schöller, Kavirond and Uganda (1898); Peake, White Nile (1900); Austin, Bright and Garner, Sobat and Lake Rudolf (1901); Kandt, Nile Basin (1901); Huot and Bernard, French Congo (1901). Much of the area of these and other districts has been surveyed and explored subsequently also, notably by Neuman, Erlanger, de Bozas, Fournet, Wickenburg, Kieffer, Loefler, Kerremans, W. H. Wylde, Matthews, Wilson, Dodson, King (1901-3); Alexander, Gosling, Gautier, Gentil, Rocquevaire, Hobley, Meinertzhagen, Uhlig, Perceval, Lyons, Duke of the Abruzzi (1904-6); Duke of Mecklenburg-Schwerin, Ayasse, Darley, Aylmer, Kumm, Cortier, Desplagnes, Chevalier, Pearson, etc. (1907-9).

Communication from the coast with the interior is fast being facilitated by the construction of railways. The Cape to Cairo Railway has now approaching 5,000 miles constructed; from the south it will soon be some sixty miles into Congo territory, having reached the border by the beginning of 1910; and from the north it is beyond Khartoum. On the west coast there are 16 systems open, constructing or proposed, and generally railway construction is progressing rapidly. There are 14,490 miles of tract open or constructing in Africa.

Political Divisions.—There are now but few independent native states, Africa having almost become politically a dependency of European Powers. The territorial developments and political adjustments have been many of recent years, but the partition of Africa among the European Powers was virtually complete by 1900. Since then, the more important arrangements include the delimitations of the following boundaries:—Abyssinia (1902 and 1907), Barotseland (1905), Nigeria (1906), Kamerun (1906 and 1908), Liberia (1907). In 1905 an area of 193,000 square miles of the Sahara was incorporated by the French into Algeria, and henceforth was known as the Algerian Sahara. In 1907 the Belgian Legislature, and in October, 1908, the late king of the Belgians, approved of the annexation to Belgium of the Congo Free State, and the Powers (except Great Britain and the United States of America) assenting, the annexation took place February, 1909, certain areas being prescribed by the Powers as available for development respectively in July, 1910, July, 1911, July, 1912. In Morocco the Algeciras (q.v.) conference, 1906, put affairs on a workable basis after the anterior upheaval. In the south, the Union of Cape Colony Natal, Zululand, Transvaal and Orange River Colony was consummated in May, 1910. The territory actually occupied or administered, claimed as under their protection, or within their respective spheres of influence, by European Powers is:

HOTTENTOT.

European Possessions or Spheres of Influence.	Area in sq. miles (est.).	Population (est.).
GREAT BRITAIN: South African Union (Cape Colony, Natal, Transvaal, Orange River Colony, Zululand); Rhodesia (Matabeleland, Mashonaland, Barotseland); Swaziland, the Protectorates of Nyassaland, Somaliland, Basutoland, and Bechuanaland; West African Colonies (Northern and Southern Nigeria—Colony and Protectorate—Gold Coast and Ashanti, Sierra Leone, and Gambia); British East Africa (East Africa, Uganda, and Zanzibar Protectorates); Mauritius, Ascension, St. Helena, Seychelles, and other islands	2,588,900	49,500,000
FRANCE: Algeria; Sahara; Tunis; Sénégal; Upper Senegal and Niger; Guinea; Ivory Coast; Dahomey, Mauritania; Congo; Réunion; Madagascar; Mayotte and the Somali Coast	4,421,934	24,576,550
GERMANY: Togoland (including Little Popo and Porto Seguro in Upper Guinea); Kamerun Protectorate; German South Western Africa (including Namaraland and Damaraland); German East Africa	931,460	14,120,000
PORTUGAL: Angola; Guinea; Portuguese East Africa (including Mozambique and Nyassa); Madeira, Cape Verde, St. Thomas, and Princes Islands	793,980	8,248,527
SPAIN: Saharan Possessions (Rio de Oro, and Adrar); Gulf of Guinea (Rio Muni, Cape St. Juan); Ceuta; Islands: Fernando Po, Annobon, Corisco, and smaller islets	80,590	305,000
ITALY: Eritrea (Red Sea Coast); East Somaliland Protectorate	175,500	950,000
TURKEY: Tripoli and Fezzan; Egypt and the Egyptian Sudan	1,756,000	14,600,350
BELGIUM: Belgian Congo	909,654	20,000,000
Total	11,658,018	132,300,736

Afrikander, a person born in South Africa of white parents. The organisation known as the Afrikander Bond played a considerable part in Cape politics after the Jameson Raid (q.v.), and was mainly in sympathy with the Dutch Republics in their struggle against England (1899-1902).

Afrit, Afreet, a powerful evil genius in the Mohammedan mythology. [JINN.]

Agades, the capital of the Aïr or Asben kingdom in Central Africa, lat. 17° 2′ N., long. 8° 5′ E. It was formerly a great depôt for the trade between the Berbers and the Songhay Empire, but has now dwindled into insignificance.

Agamemnon, the epic hero who succeeded his father Atreus, as king of Argolis. During the usurpation of Thyestes and Ægisthus he took refuge with his brother, Menelaus, at the court of Tyndareus, king of Sparta, and there married the princess Clytemnestra, Menelaus taking to wife her sister Helen. When the latter was carried off by Paris, Agamemnon took the command of the expedition against Troy. On reaching Aulis, the chief killed a deer sacred to Artemis, and, as a punishment, the fleet was detained by contrary winds until, at the bidding of Calchas, he sacrificed his daughter Iphigeneia to appease the offended goddess. However, the victim was not really slain, for Artemis substituted a stag, and carried the girl off to be her priestess at Tauri. The feud between the king and Achilles began with a slight quarrel at Lemnus or Tenedos, and reached its height when the former, being compelled to give up the captive maiden Chryseis, by way of compensation seized Briseis, who had been allotted to Achilles. Then followed the quarrel that forms the subject of the *Iliad*. Whilst Achilles sulked in his tent, Agamemnon fought gallantly, though in vain, and was wounded. Agamemnon is always referred to in the *Iliad* as the "king of men," and is presented as a proud, haughty, but brave and courageous chieftain After the capture of Troy, the king returned to Mycenæ, taking Cassandra, the daughter of Priam, as part of his spoils. On his arrival he was murdered by his wife and her paramour, Ægisthus. The fate which hung over the house of Agamemnon formed the subject of the great trilogy of Æschylus, the *Agamemnon*, the *Choephori*, and the *Eumenides*. Orestes presently, under the influence of the curse of Atreus, slew his mother, Clytemnestra, thus avenging his father, but bringing on himself the pursuit of the Furies. The tomb of Agamemnon was in later times pointed out at Mycenæ (Pausanias, ii. 16, 5), while excavations made under the direction of Dr. Schliemann at Mycenæ are thought to have led to the discovery of the tomb itself.

Agami. [TRUMPETER.]

Agamidæ, an extensive family of lizards of the division Crassilingues, representing in the Eastern Hemisphere the Iguanas of the New World. The body is broad and flat, and the skin covered more or less with spiny scales. They are terrestrial in habit, and are found principally in deserts and sandy places. Many of them have vivid and varied coloration, and to this family belong the "dragons" or flying lizards.

FLYING LIZARD (*Draco volans*)

Agamogenesis, reproduction by non-sexual methods, such as by budding, fission, or parthenogenesis (q.v.).

Agape, or LOVE-FEAST, the name given to a kind of feast held by early Christians in connection with the Communion. At first these feasts were mainly used as opportunities for the wealthy to feed their poorer brethren, but later the holders were charged with impurity, and finally the institutions were banished from the church.

Agapemone, the abode of love, the name given to an institution founded in 1859, near Bridgewater in Somersetshire, by the Rev. H. J. Prince, which was at one time very notorious. For some time after the death of Mr. Prince very little was heard of the Society, but in 1902 public attention was again called to it by its pastor, the Rev. Smyth Pigott, who claimed to be the Messiah.

Agar-Agar, or BENGAL ISINGLASS, a vegetable gum extracted from seaweeds. It is brought from parts of Asia in the form of transparent strips.

Agaric (from the Greek *agarikon*, a mushroom), a general name for the species of the genus *Agaricus*, a group of *hymenomycetous* fungi (*i.e.* those fungi which have the hymenium exposed on the surface of the spore case [FUNGI]), of which the mushroom (q.v.) is the most familiar example. Like all the other *Agaricinæ*, or genera belonging to the same tribe, *Agaricus* has its "hymenium," or spore-bearing surface, spread over a series of plate-like gills ("lamellæ"), radiating from the stalk underneath the umbrella-like "pileus," or cap. In this genus the gills are membranaceous, have a tendency to split into two plates, are acute at their edges, and are persistent until the whole pileus putrefies. The hymenium passes into the somewhat flocculent interior mass or "trama" of the gill; and the spores fall off their "basidia" or pedicels. As the genus includes nearly a thousand British and over twelve

hundred European species, the total number of forms included in it must be very large.

Agassiz, JEAN LOUIS RODOLPHE, the greatest ichthyologist of last century, was born at Motier, on the Lake of Morat, in Switzerland, May 28th, 1807, where his father was pastor, his mother being the daughter of a physician. As a boy he kept pets of all kinds, including fish. He was educated at the gymnasium at Bienne, the academy at Lausanne, the medical school at Zurich, and at the universities of Heidelberg and Munich. At Heidelberg he had Tiedemann, the anatomist, Leuckart, the zoologist, and Bronn, the palæontologist, as his teachers, and Schimper and Braun, whose sister, Cécile, afterwards became his first wife, as fellow-students; and at Munich he lodged with Döllinger, the embryologist, and attended lectures by Martius, Schelling, and Oken. In 1829 Agassiz took his degree as Doctor of Philosophy at Erlangen, and in 1830 that of Doctor of Medicine at Munich, though not wishing to practise. He was entrusted by Martius with the description of the fishes collected during the Brazilian voyage, the publication of which served as an introduction to Cuvier and Humboldt on his visiting Paris in 1831. Here he attended Cuvier's last lectures, and imbibed his teleological and anti-evolutionary opinions, receiving also from him all his notes and drawings relating to fossil fish. In 1832 he became Professor of Natural History at the newly organised Lyceum at Neuchatel, a chair which he retained until 1846. During this period he produced his chief work, the *Recherches sur les Poissons Fossiles*, in five volumes, with 311 plates, describing 20,000 specimens, belonging to 1,700 species, contained in eighty of the chief museums of Europe. In this work he uses the scales as a basis of classification, establishing the order of "Ganoids," and points out the correspondence between the development of an individual fish and the succession of types of fish-structure in geological time. During the progress of this work he became a member of the French Academy of Sciences and of the Royal Society, visiting England in 1834, 1835, and 1840. In 1836 he adopted Charpentier's views as to the former greater extension of the glaciers of the Alps, and subsequently propounded the theory of a Glacial Period (q.v.), converting Buckland and Lyell to his views, as published in his *Études sur les Glaciers* (1840) and *Système Glaciaire* (1846), and showing glacial action to have occurred in Scotland, Wales, and the Lake District. With the help of Desor he completed, in 1842, his *Monographie d'Echinodermes Vivans et Fossiles*, and in 1845, with that of Karl Vogt, his *Freshwater Fishes of Central Europe*. In 1846, with the assistance of many other naturalists, he issued his *Nomenclator Zoologicus*, which was supplemented in 1848 by the *Bibliographia Zoologiæ and Geologiæ*. In 1846 Agassiz went to America, originally on a temporary lecturing tour, but, as it proved, for the remainder of his life. He aroused a remarkable enthusiasm for scientific research; a chair was endowed for him at Harvard; and government steamers were placed at his disposal for coast dredging. In 1857 he issued the first volume of his *Contributions to the Natural History of the United States*, containing the celebrated *Essay on Classification*, his last great work. The Museum of Comparative Anatomy at Harvard, established in 1859, now became the chief object of his life. In 1865 he made a journey in search of health and specimens to Brazil, accompanied by his second wife (*née* Cary), and in 1871 he made a cruise right round South America, in the *Hassler*. On his return, Mr. John Anderson presented him with Penikese Island for a school of marine zoology, and he had just successfully launched this, his final idea, when his life of unremitting scientific toil ended peacefully at Cambridge, Mass., 14th December, 1873.

Agate, named from the river Achates in Sicily, where it was found, a form of quartz or silica (SiO_2). It consists mainly of the chalcedonic or non-crystalline variety, but contains layers of crystalline quartz. It occurs in rounded nodules in amygdaloid basaltic rocks, especially at Oberstein and Idar, on the Nahe, in Germany; in Uruguay, in New South Wales, in Scotland, and elsewhere. Lapidaries often know the stone as "Scotch pebble," but the chief factories, those in Germany, now derive their main supply from Uruguay, *viâ* Brazil. The nodules seem to have originated as bubbles, or infiltrations of gas-cavities, in the rock when fused, every gradation being traceable from the hollow "geode" or "potato-stone" with a mere lining of quartz-crystals to the perfectly filled agate. The various layers are of different tints, mostly of gray, but, varying in porosity, are artificially tinted at Oberstein to almost every colour, by boiling in metallic salts. If in regular concentric bands the agate is termed *onyx*; if in bands with an angular, zig-zag, or bastion-like outline, *fortification-agate*; whilst the subsequent infiltration of colouring-matters along fissures has produced the forms known as *moss-agates* and *pagoda-stones*. Fracture and re-infiltration have produced the *ruin-agate*. Agates are often found in river-gravels, having been liberated by the weathering of the rock containing them. By the ancients agate was chiefly valued as a material for carving cameos and intaglios, a layer of one colour being cut away so as to reveal another differently tinted. In addition to its use for ornamental purposes, seals, beads, rings, etc., agate is employed for metallurgical pestles and mortars.

Agathocles, the son of a potter at Rhegium, who, by his ability, made himself tyrant of Syracuse, 308 B.C. After several victories over the Carthaginians, he met with defeat, and his soldiers drove him out, killing his sons. He contrived, however, to reinstate himself, and destroyed the Macedonian fleet off Corcyra, ravaging also the coasts of Italy. He died in 290 B.C., aged seventy-two.

Agave, a large genus of *Amaryllidaceæ*, mostly natives of the southern parts of North America, yielding several useful substances. In structure the Agaves bear a great resemblance to the Liliaceous, genus *Aloë* (q.v.), differing from most

Amaryllidaceæ in the absence of bulbs, in their thick woody stems, thick fleshy and often spinous leaves, valvate æstivation and hollow styles. They differ from Aloes in having an inferior ovary. The Agaves produce flowering stems, sometimes many feet in height, which vegetate for many years, ultimately producing a large terminal panicle of flowers and dying of the effort. A single plant may produce 5,000 flowers, so that the ground beneath is wet with the honey distilled by them. *Agave americana* is known in the United States, from a mistaken idea as to the period of vegetative growth, as the "century plant," and in the Mediterranean region, where it is naturalised, as the "American

AGAVE (*Agave Americana*). *a*, Flower.

aloe." In Mexico it is cultivated, under the name of "maguey," over 50,000 square miles for the sake of its saccharine sap and its fibre. The terminal bud is cut out just before flowering, and abundance of sap exudes, which is fermented into a drink called *pulque*, that yields on distillation a spirit known as *mescal*. The fibre of the veins of the leaves was used by the ancient Mexicans for paper, and is now largely exported for the same purpose and for cordage. That of *A. americana* is known as *Pita* or *Mexican grass* and is shipped from Tehuantepec; that of *A. vivipara* is termed *Silk grass*, and that of *A. sisalana*, shipped from Yucatan and now also from Jamaica, *Grass* or *Sisal hemp*.

Age, in *Law*, the time of competence to do certain acts. The period before a person reaches twenty-one is termed infancy, and during that time all contracts, other than contracts for necessaries, made by the infants are void. A boy at fourteen, however, and a girl at twelve may make a legal marriage. Between the ages of fourteen, when the infant is said to have arrived at partial discretion, and twenty-one, the boy or girl is fully responsible for criminal acts. At twenty-one full age in both sexes is reached.

In *Archæology* the antiquarians divided the period of man's existence on the earth into three *ages*, the stone age, the bronze age, and the iron age. The first is subdivided into the Palæolithic and Neolithic ages. [ARCHÆOLOGY, PALÆOLITHIC, NEOLITHIC.]

Age is also used to denote particular periods of time distinguished by particular characteristics. Hesiod made five ages: the Golden Age, governed by Saturn, characterised by simplicity and peace; the Silver Age, governed by Jupiter, distinguished by licentiousness and profanity; the Brazen Age of Neptune, which was warlike, savage, and wild; the Heroic Age in which a desire for higher things comes in; and the Iron Age governed by Pluto, when justice, truth, and honour had altogether vanished. We also speak of the *Dark Ages*, the *Middle Ages*, etc. Shakespeare divides the life of man into seven ages (*As You Like It*, ii. 7).

Agelacrinus, a genus of CYSTOIDEA, with a flat, disc-shaped body, from the centre of the upper side of which radiate five curved ambulacral grooves, which give it a rather starfish-like appearance. The genus ranges from the Lower Silurian to the Carboniferous systems.

Agen, the chief town of the department of Lot-et-Garonne, France, is situated on the Garonne, 73 miles from Bordeaux. Its facilities for water-carriage make it an important centre of business.

Agent, one who acts for another in any kind of business, generally either commercial, legal, social, or political. The principal (for whom the agent acts) is bound to abide by the acts which the agent performs during the transaction of the business, and if they are within the scope of his employment as expressed or implied. The term political agent is especially employed in India to denote intermediaries between the British Government and the native states.

Agesilaus, son of Archidamus II., was put upon the throne of Sparta in preference to his nephew, Lysander (398 B.C.). To check the designs of the King of Persia he led an army into Asia, but in the moment of victory was recalled, owing to the league formed by Athens and Thebes against Lacedæmon. At Chæronea (394 B.C.) he defeated the allies, but his illness allowed the Thebans to achieve some successes. These he retrieved after recovering his health. His military policy entailed many losses on his country, but his courage, skill, and high moral character won him the confidence of his subjects. He died in 360 B.C., at the age of eighty-four.

Agglomerate, a coarse, usually unstratified accumulation of lava and other rocks, in angular or sub-angular masses, generally in a glassy or semi-

crystalline ground-mass, which has accumulated at the close of an eruption in the chimney or bottom of the crater of a volcano, thus forming a "neck," or central mass resisting denudation, in a volcanic hill.

Aggregation. Many substances are capable of existing in the three forms of matter—solid, liquid, and gaseous; and the difference between them in these diverse conditions is supposed to consist in the distances which exist between their ultimate molecules. Again, many substances are identical in chemical composition and in physical state, but entirely different in their physical properties, and here, again, the difference is due to the dissimilar ways in which the same elementary molecules are aggregated. [ALLOTROPY.] An excellent clue to the laws of aggregation will doubtless often be furnished by a study of colour changes.

Aghrim, or AUGHRIM, a village in Galway, 4 miles W. of Ballinasloe, celebrated for the victory of General Ginkell, in command of the army of William III., over the troops of James II. under St. Ruth in 1691. The Irish numbered 25,000, and lost 7,000, besides their commander. The English casualties amounted only to 700 killed and 1,000 wounded. This action so crippled the adherents of James II. in Ireland that complete submission soon ensued.

Agincourt, the scene of the famous battle between the English and the French, is situated in the north of France, in the department of Pas-de-Calais, to the S.W. of Boulogne. The battle took place in October, 1415, when Henry V., who had landed with a force of 15,000 men at Harfleur, was opposed at Agincourt by an army numbering 50,000, under the Constable D'Albret. After a bloody contest lasting for three hours, the English gained a signal victory, losing only 1,600 men, while the French loss was estimated at 10,000. One of the results of this engagement was the Treaty of Troyes (q.v.). A good deal of the action in Shakespeare's *Henry V.* takes place on the battle-field of Agincourt.

Agio, a term used in commerce to signify the difference between paper money and actual coin; also used in the sense of premium, an amount given above the nominal value of any article.

Agis, the name borne by four kings of Sparta. I. reigned, according to tradition, about 1037 B.C. II. occupied the throne from 427 to 399 B.C., and was distinguished in the Peloponnesian War, defeating the Athenians at Mantinea, 414 B.C. III. succeeded (338 B.C.), and took an active part in the struggle against Alexander the Great. He was killed at Megalopolis in a battle with Antipater, 331 B.C. IV. began to reign in 244 B.C., and strove to revive the ancient institutions of Lycurgus. In this he was opposed by the wealthy classes under Leonidas, his colleague, but was supported by Lysander, Mandroclides, and Agesilaus. Leonidas was banished, and Cleombrotus put in his place; but the intrigues of Agesilaus frustrated all plans of reform. Agis now led an army to assist the Ætolians against the Achæan League, and was moderately successful. On his return, however, he found Leonidas in power, and was thrown into prison, where he was soon after strangled, with his mother and grandmother, 240 B.C.

Agnano, a lake occupying the hollow of an extinct volcanic crater near Naples. Its circumference is about two miles, and on its shore is the famous *Grotto del Cane*, a small artificial recess, in which the carbonic acid gas emitted from the soil below rises to the height of eighteen inches, and thus kills a dog, whilst a man escapes with impunity.

Agnates, *in law*, kinsmen by the father's side, as opposed to *cognates*, kinsmen by the mother's side. The ancient Roman distinction between agnates as persons related to each other through males only, and cognates as persons related through one or more females being interposed, was abolished under Justinian.

Agnes, ST., a Roman maiden who, according to ecclesiastical legends, was martyred under Diocletian (A.D. 303) at the age of 13. She was canonised, and her name has ever been associated with virgin purity and girlish faith.

Agnesi, MARIA GAETANA, an Italian lady born at Milan, 1718. She early displayed great mental powers, and mastered the classical languages, Hebrew, and most European tongues in her childhood, besides acquiring a thorough knowledge of mathematics and philosophy. She wrote a valuable treatise on Algebraic Analysis, and for a time filled her father's place as professor at Bologna. Retiring into a convent, she died in 1799.

Agni, the name for the Indian god of fire, who is supposed to have especial dominion over the south-east quarter of the world.

Agnone, a town of S. Italy, at the foot of Monte Capraro. It is famous for the manufacture of copper goods.

Agnosticism, the doctrine that no knowledge of a spiritual world does or can exist for mankind, must be carefully distinguished from Atheism, which asserts dogmatically that there is no God. Professor Huxley derived the word Agnosticism from the inscription on the altar seen by St. Paul at Athens (Acts xvii. 23), *Agnosto Theo* (to an unknown God), and the possibility of the existence of a Deity is not denied, the conclusion of philosophy being accepted, that, as all knowledge rests on the law of the uniformity of nature (a law merely coextensive with human experience), where experience stops knowledge must stop also. The necessity for an Ultimate Cause, or Persistent Force, is recognised, but to quote Herbert Spencer's words, "our own and all other being is a mystery for ever beyond our comprehension." The question arises as to what Agnosticism can substitute for the sanctions of religion when the dictates of morality are concerned. Love of our fellow-creatures and self-sacrifice for their sakes seem to be generally regarded as the result of the gradual strengthening of the sympathetic emotions in the evolution of humanity, and it is asserted that this development will

continue. But it obviously remains to be proved whether such is the case, and also whether with most men altruistic sentiments will prevail when unsupported in the conflict with the contradictory impulses of a strong egoism.

Agnostida, the family of Trilobites (q.v.) characterised by the possession of the smallest number of body segments, viz. two; they were blind. It ranges from the Upper Cambrian to Lower Silurian.

Agnus Dei, "the Lamb of God," is used: (1) as a title of Christ (John i. 29); (2) as the name of a prayer in the Catholic Church service; or a musical setting of the same; and (3) as the name for cakes of wax, silver, or gold stamped with the device of a lamb bearing a cross. These medals are consecrated by the Pope and given away to the people. They were formerly used as amulets (q.v.).

Agones, the name given to the national games that were such important institutions in ancient Greece. The word is etymologically connected with the Greek *agorá*, and signified primarily "an assemblage." There were four of these great gymnastic and equestrian contests: the Olympian, the Pythian, the Nemean, and the Isthmian games.

Agonic Line. The magnetic needle does not, as a rule, point to the true north. Thus, at London the declination from the true north is now about 18° to the westward. There are, however, certain points on the earth's surface where the magnetic and geographical meridians coincide, that is, where the needle points true north and south. These points lie on an imaginary line called the agonic line or line of no variation, which is of some importance in navigation. Roughly speaking, the western portion of this line traverses Hudson's Bay, Cape Hatteras, and the South Atlantic; the eastern portion crosses the White Sea, the Caspian Sea, the Indian Ocean, and the Great Australian Bight.

Agora, the market place of a Greek town which corresponded very much to the *forum* of the Romans. The *agora* was frequently used as the place for public meetings and assemblies; the term was also applied to the assemblies themselves, in which sense it signified much the same as the more common term *boulē*.

Agouta, the popular name of *Solenodon paradoxus*, a small insectivorous mammal with a long trunk-like snout, from St. Domingo. Its sole congener (*S. cubanus*), from Cuba, is popularly called Almiqui.

Agouti, the name given to any species of the South American rodent genus *Dasyprocta*. *D. agouti* is the best known form; it is from eighteen to twenty inches long, somewhat like a small, slender-limbed pig, varying from brown to yellow in colour, with the middle line of the abdomen white. It is very quick in its movements, and often does considerable damage to gardens and sugar plantations. In the southern parts of Brazil and Paraguay, and Bolivia, it is replaced by *D. azaræ*, Azara's agouti; the Acouchy (*D. acouchy*),

AGOUTI.

a smaller species, is found in Guiana, the North of Brazil, and some of the West Indian Islands.

Agra, a province and city situated in the Doab. In 1902 the province was joined with Oudh to form the United Provinces of Agra and Oudh. The area of the province is about 83,198 square miles. As regards physical characteristics the country presents an almost uniform level intersected by watercourses and small ravines. The elevation above the sea is about 650 to 700 feet. The four chief rivers are the Jumna, the Chambal, the Uttangan, and the Kari. The population of the province in 1901 was 34,858,705, of which 88 per cent. are Hindus. The city—situated on the right bank of the Jumna—is on the whole the most handsome city in Upper India, and is a very important railway centre.

Agra City, the capital of the district, is situated on the river Jumna, stretching in a semi-circle along the banks for a distance of 4 miles. It was formerly the capital of the North-West Provinces, and is a fine, prosperous, and populous city. Lord Lake captured the place from the Mahrattas in 1803, and in the mutiny of 1857 many European refugees found safety here. The glory of Agra is the Taj-Mahal, the marvellous white marble tomb erected by the Emperor Shah Jehan to the memory of his favourite wife, Mumtaza Mahal. Within the fort, which was built by Akbar at the end of the sixteenth century, are two other noble buildings—viz. the Audience Hall of Shah Jehan, and the Moti Musjid or "Pearl Mosque," a gem of Indian-Mohammedan art. The town contains three important colleges and a medical school.

Agrarian Laws, or laws relating to land. Such laws were enacted at various times by the Romans to regulate the *ager publicus* or public domain. At the foundation of Rome, when the city was very limited in extent, the whole land was *ager publicus*, that is, unappropriated public property, every citizen receiving, however, an interest in it as a tenant at will of the State. As time progressed the descendants of the original founders, or patricians,

transformed these primitive concessions into absolute rights (termed in the Roman law *de jure quiritio*). This principle prevailed during the whole time of the Republic, and all property acquired by conquest was acquired for the State, and could only become the property of individuals by concession from the State. The class of the plebeians was subsequently founded, when conquests had increased, and lands were given as private property conditional on the payment of a tribute or undertaking public services; but the patricians always retained their ancient right of receiving in possession and using parts of the public domain on paying to the public treasury a tithe of the product. Lands thus held could pass by inheritance, and were sold, notwithstanding that the State could always resume possession.

In almost all countries the land has been originally vested in the sovereign or chief, or the people at large. Similarly, the land of a conquered country was held to be transferred to the sovereign power of the conquering State, and to be subject to the laws for its regulation from time to time enacted concerning it by such State.

Agricola, CNÆUS JULIUS, a famous Roman general, born at Forum Julii in Gaul, A.D. 37. He served in the East as quæstor, and attached himself to Vespasian, who made him governor of Aquitania, A.D. 73. After filling the consulate in 77 he was sent to govern Britain, where he conquered the Ordovices in N. Wales, and took Mona (Anglesea). He crossed the Tweed, and in 80 pushed on to the Firth of Tay, building a chain of forts from the Clyde to the Solway Firth. His policy in Britain was conciliatory, and he did his best to win over the native population to Roman manners. He was recalled by Domitian, to whom his popularity was distasteful, and lived till 93 in retirement. There is reason to suspect that he was poisoned by the emperor. Tacitus the historian, who was his son-in-law, wrote his life.

Agricola, JOHANN, originally named Schneider, was born at Eisleben in Saxony, 1492. He formed a friendship with Luther at Wittenberg, but later on broke off his attachment to the reformer, who maintained that the Ten Commandments were binding on Christians, whereas Agricola absolved them from any obligation to the Mosaic law. The sect that adopted this view became known as Antinomians. Its founder died in 1566, leaving behind him many theological works and an interesting collection of German proverbs.

Agricola, RUDOLPH, a learned Dutchman, born near Groningen in 1443. After studying in Italy, he became professor at Heidelberg, 1482, and died there three years later. Erasmus praised his scholarship, and he was by all accounts a highly accomplished man.

Agriculture. *Its development.*—The pursuit of agriculture is an art, not a science, for the lines on which it is conducted are elastic, variable, and adaptable. It is greatly influenced by climate, seasons, weather; by latitude, altitude, location; by the character of soils, the supply of water, and by the tastes, habits, and requirements of different nations. The accumulated experience of many generations of men, particularly in Western Europe and Eastern Asia, has raised it to the dignity of a high art; yet, though some of the sciences—chemistry, geology, botany, biology, for example—have been very freely enlisted into its service, the extrinsic influences by which it is surrounded will not admit of it becoming, strictly speaking, a science.

It may be said, however, that we have the science as well as the art of agriculture; and these combined embrace and accomplish all that is known on the subject: hence it is that the union of science and practice in agriculture has produced such striking results in our time. The careful investigations of Mendel in his time; the remarkable results obtained to-day by Luther Burbank from his extensive experiments, all tend to prove that the scientific side is no less active than the practical. In this latter the progress in mechanical improvements has later reference, but mention may here be made of ameliorative efforts such as the establishment of the Board of Agriculture in 1889 and Earl Carrington's work in securing facilities for taking up Allotments (q.v.) and Small Holdings, the rapid development of which was one of the most striking agricultural features of 1909-10.

The nineteenth century witnessed developments in agriculture greater, perhaps, than those of all previous time—in the British Islands, at all events, whatever it may have done elsewhere. The introduction of steam ploughs and cultivators, of reaping, mowing, and threshing machines, of centrifugal cream separators, mechanical butter workers, and cheese and butter factories, of artificial manures, and imported feeding-stuffs, more than sufficiently distinguished it from all others, and these are only the leading things in a great number of striking innovations which occurred in the closing years of the century. Nor must we omit the stupendous importations of breadstuffs and dairy produce from foreign countries, and the vast trade in American and Canadian beef, both dead and alive, and in Australian and New Zealand mutton, all of which have had a pronounced influence on the character of British agriculture. Taking a comparison, the number of persons in the United Kingdom employed in agricultural pursuits was 3,347,998 in 1851, and in 1901 2,110,000, and whilst the average weekly wage of the labourer in 1851 was 9s. 3½d., in 1907 it was 14s. 6d.

Wheat-growing.—Since the middle of the 19th century the tendency of British agriculture has been gathering increasing strength in the direction of stock-raising and dairy-farming, and away from arable cultivation. The vast wheat-growing regions of Western America and of Eastern Europe have interfered seriously with English wheat-growing. The plough, greatly improved as to beauty as well as utility, no doubt, is less the symbol of practice than it formerly was. After the middle of the century its fame was found to be suffering, and its importance to be diminishing, when Fowler, and Howard, and others, introduced the steam plough. The stiff soils on which our wheat was grown were too costly to cultivate at a profit with horse-power.

and steam was introduced, thus checking the downward tendency. For some years past, however, it has been freely admitted that, on heavy soils, wheat-growing at a profit is out of the question; and that on medium and light soils wheat is no longer the crop to which the others of the course (ROTATION) must be made subsidiary. The value of wheat straw has risen as the value of wheat has fallen, and it has not uncommonly happened that the straw was worth as much as the grain; in this way, indeed, there has been a little compensation; and although straw has no commercial value in the American wheat regions, and is commonly burnt to get rid of it, the bulk of it compared with the value is too great to admit of its being brought in quantity to Europe.

Statistics.—The average value of wheat per imperial quarter was, in 1908, 32s., as compared with 63s. 9d. in 1868; the average yield of wheat per acre in 1908 was 31.50 bushels, while that of the United States in the same year was 14.0 bushels. In 1890 the total import into England of wheat (excluding flour) was 14,063,760 quarters; in 1908 the amount was 23,000,000 quarters. The value of the live cattle imported in 1877 was £3,817,499; in 1908 £7,100,000. In 1908 the imports of dead meat (excluding bacon and hams £17,600,000), was to the value of £20,080,000, a drop of nearly £1,000,000 on the previous year. The total acreage under cultivation in the United Kingdom at the beginning of 1909 was 46,900,000.

Live Stock.—The tendency, therefore, in England has for some years been to lay down more and more land to permanent grass. The live stock of the farm were formerly regarded as subsidiary to crops on arable farms, but now the position to a great extent is reversed, and crops are subsidiary to live stock. On the mixed farms of this country the crops produced on arable land are supplementary to the hay-crops of the meadows as food for stock in winter; and also, indeed, in summer, green crops are made additional to the grass of the pastures. As showing the increase in the raising of live stock it may be noted that of the total acreage of the United Kingdom (46,900,000) no fewer than 28,600,000 acres were permanent pasture or grass in 1909.

The following table of stock in the United Kingdom for the years noted is also instructive:—

	1876.	1906.
Horses	1,863,410 ..	2,108,879
Cattle	9,995,023 ..	11,782,061
Sheep	32,262,579 ..	29,109,971
Pigs	3,734,429 ..	3,490,282
Totals	47,855,446 ..	46,450,143

The substantial increase in the rearing of horses and cattle will be noted; whilst the diminution of the number of sheep raised is accounted for by the great increase in the imports of foreign and frozen mutton.

Dairy-farming.—Perhaps the most remarkable transformation that has taken place is seen in the growth of the milk trade between cities and country farms. This trade has grown up almost entirely since about 1865, and is now very large and important. It is not too much to say that the milk trade has been a prop without which dairy-farming would have fallen into disaster almost equally serious with that through which arable farming has had to pass. Stock-raising, however, is a part and parcel of dairy-farming, and with the exception of intervals, fortunately of brief duration, occurring now and again, this branch of husbandry has been profitable. The consumption of milk by urban populations has greatly increased during recent years, it now being commonly conveyed 150 miles and upwards, by rail, from milk-producing districts to towns and cities. From Derbyshire, for example, milk is sent to London in very large quantities, and even to Newcastle-on-Tyne. Commendable facilities have been afforded to the trade by many of the leading railway companies, but it may be said that still more favourable conditions might be given with advantage alike to farmers, to the public who drink milk, and to the railway companies themselves. The position of dairy-farming to-day, despite the enormous importations of cheese and butter from various foreign sources, is one of hopefulness, demanding, however, keener and more energetic management than it formerly did. The profits alike of stock-raising and of milk-production vary year by year. Dairy produce showed an all-round reduction in 1908 as compared with 1907; but, on the other hand, the importation of butter from abroad did not evidence any increase, remaining at about 210,500 tons. In 1908, in the United Kingdom, there were 4,350,000 cows and heifers in milk or in calf.

The lines on which dairy farming is being developed are in the direction of more extensive improvement of the soil. The milk trade, which is gradually extending in all districts which possess cattle and also railway facilities, requires better management of stock and land than is considered necessary for cheese and butter-making purposes. The use of artificial manures on the land, and of purchased feeding-stuffs to cattle, is extending, and cannot fail to enrich the soil and increase its stock-carrying capacity; hence it follows that an efficient tenant-right Act is more than ever necessary, to secure tenant farmers' interests in the improvements they contribute to the soil of the country. To what extent in the future the competition of other countries in store and fat cattle, in dressed beef, and in dairy products, will affect the dairy farmers of Great Britain, remains to be seen. So far its effect has been to stimulate them to greater exertions. The quality of our cheese and butter is improving, cheese and butter factories are becoming more numerous, and tuition in dairy work is extending, while improved dairies, dairy appliances and machinery, have greatly lessened the drudgery and untidiness which in former times were almost unavoidable.

Fruit farming, flower-growing, etc.—The cultivation of fruit and hops, and market gardening generally, has of late years assumed a position of much greater importance than that which it formerly held; and but for the incubus of heavy railway rates for transport, and in some instances the "extraordinary tithe," this branch of agriculture

would increase even more rapidly than it does. It is considered imperative that all restrictions should be taken from the development of these industries, leaving the law of supply and demand to regulate the extension.

The growing of flowers for the markets has lately received much encouragement, and this industry is now found sufficiently profitable by some to merit their whole attention.

Agricultural Societies.—The Board of Agriculture, established in 1889, collects and prepares statistics of various kinds, besides performing other duties. The Royal Agricultural Society, the British Dairy Farmers' Association, the Smithfield Club, the Highland and Agricultural Society of Scotland, and the Royal Agricultural Society of Ireland, are national in their scope and influence in the three kingdoms; and a large number of societies and farmers' clubs exist, more local in character, amongst which the Bath and West of England Society is at once the oldest and most important. And, in addition to these, there are various societies which exist for the improvement of horse-breeding, which in recent years has found a great and most gratifying revival. Several of the societies mentioned aim not only at the improvement of whatever in agriculture is susceptible of improvement, but also at the agricultural education of the rising generation of farmers. The annual exhibitions held by all the societies are in themselves a perennial source of education of the highest practical importance, resulting in an all-round improvement in farming methods, management of dairies and stock, and in machinery. The National Agricultural Union and the British Agricultural Organisation Society amalgamated in 1901, becoming known as the Agricultural Organisation Society, to which the Board of Agriculture makes an annual grant of £1,200 (up to £1,600) for carrying out its educative propaganda by means of salaried agents in all parts of the country. In 1910 nearly 350 societies were affiliated with the A.O.S., and over 900 Irish societies with the similar organisation in Ireland.

Agricultural Education.—Public institutions, existing to impart scientific and practical agricultural education, are not as numerous as they perhaps ought to be in Great Britain. The Royal Agricultural College at Cirencester stands at the head of them in seniority, closely followed, if not indeed surpassed, in *practical* efficiency by the College of Agriculture, Downton; the Colonial Training College, in Suffolk; and the Glasnevin Agricultural College, near Dublin. The education imparted at these places is varied and thorough, embracing subjects strictly agricultural in character and the cognate sciences. Altogether there are (1910) nine colleges in the United Kingdom, which may be considered as agricultural universities; there are at least another half-dozen which give comprehensive courses, but without degrees, and in addition there have grown up in recent years a number of dependable institutions in various parts of the country which either give general agricultural instruction of a less advanced character or confine themselves to some particular phase of the subject. In addition is the Royal Veterinary College, established in 1791. Under this head, too, must be included the Rothamsted experimental station established by the late Sir J. B. Lawes, and the Lawes Agricultural Trust established in 1899 by Sir John Lawes. Many of our leading farmers take pupils, and a practical education may be obtained on a farm quite equal to that at a College, whatever may be said as to the theory or science of the art of agriculture.

The Agricultural Labourer.—That the condition of the agricultural labourer has been sensibly improved in recent times is as true as it is satisfactory. He is now better fed, better clothed, better housed, better educated, better able to make provision for old age, than he ever was before. Able to read for himself, the power of the labourer to better himself cannot but increase in an age of cheap and abundant literature; he becomes more intelligent, more energetic, more self-reliant; he is more in feeling a citizen of the world. At the last census there were 869,728 farm labourers and servants, as against 1,192,725 in 1881.

The Future of Agriculture.—The position of agriculture is hopeful, for the age is progressive. A long period of depression has followed one of inflation. The leaps and bounds of the "seventies" have wholly subsided for the time being. It is a period of transition and adaptation, of new departures. Not the least important is the legislation that culminated in the facilities for obtaining allotments or small holdings. On the passing of the Small Holdings Act of 1892 an experiment was made with 88 acres let out into 1 and 3 acre plots. It met with such success that by 1906 the Association formed to carry on the experiment held 650 acres. Earl Carrington, Mr. Rider Haggard, and others specially interested in land questions, drew attention by their labours to the great "land hunger" that existed, and the ultimate result was seen in the Small Holdings and Allotments Act of 1907, which came into force on January 1, 1908. By it, allotments up to 5 acres and small holdings up to 50 acres can be obtained on equitable terms, and County Councils have power to compulsorily acquire land for such purposes. Under the later Act which came into force in 1909, the powers of local bodies were extended. There were 23,285 applicants for 50-acre holdings in 1908, and 21,540 for allotments. Schemes for the acquisition of 92,000 acres had been received up to November, 1910, and loans had been sanctioned to the amount of nearly £1,500,000.

Foreign Farming.—The condition of agriculture in continental Europe will compare unfavourably, all things considered, with that of Great Britain, save, perhaps, in some of the smaller countries—Belgium, Holland, Denmark. The employment of women in the toil of the fields is still continued in France and Germany. The peasant proprietors of France and the *petite culture* which is so commonly found in that country, and to some extent in countries adjoining, do not present a picture which is calculated to excite very much the envy and emulation of England, but this is to an extent due to the unwise subdivision of

already diminutive plots. A 20-acre holding often is split up into fifty or more individual plots. In the early years of the present century, of the 8,000,000 proprietors in France 8,000,000 were on the pauper roll, but agricultural co-operative societies or syndicates are obtaining hold in that country and better conditions are beginning to prevail. In Germany peasant proprietors live in the western states, the large estates are many in the north, and in southern Germany the small-holdings system prevails. In mid-Germany are "free labourers" who possess plots of land held on varying forms of tenure handed down from feudal times. In Holland, again, the small proprietor prevails, 56·4 of the total cultivated area being held by such, and in Belgium and Denmark much the same conditions obtain. Italy is perhaps the country in Europe which devotes most attention to agricultural pursuits, though Hungary has the greater percentage. Three methods prevail: the metayer, or profit-sharing system, with its three divisions—*mezzadria, mezzeria, colonia;* the leasehold or *affitto* system; and the system of home cultivation by hired (*salario*) agricultural help. Land tenure in Switzerland is mostly in the form of small freeholds, and the best relations exist between farmer and labourers. Both in Russia and Austria conditions are so complicated and diversified as to debar inclusion here. From statistics compiled at various times and based on census reports, the percentage of population engaged in farming shows that foreign countries devote far more attention to farming and kindred occupations than we do, except in Ireland. Thus Hungary (1900) has 68 per cent.; Italy (1901), 59; Russia (1897), 58; Austria (1900), 58; Sweden (1900), 49; Denmark (1901), 48; France (1896), 44; Ireland (1901), 44; Norway (1900), 41; Germany (1895), 37; Switzerland (1888), 37; Holland (1899), 30; Belgium (1900), 21; Scotland (1901), 12; England and Wales (1901), 8.

American Agriculture.—It is notorious that the majority of American farmers in the West are mortgagors, paying a high rate of interest that is worse than a rent. Farming on the North American continent is generally of an order which an English or Scotch or Welsh farmer would fail to appreciate. This, with exceptions, is true alike of Canada, of the United States of America, and of the United States of Mexico. In each of these vast countries, however, there are districts the farming of which would be no discredit to the Lothians or to any county in England. The rapid spread of farming in most of the Western States has made its mark in the Eastern ones, just as the opening up of the North-West of Canada has told its tale to the farmers of Ontario, Quebec, and the Maritime Provinces. Here, too, as in England, yet still more rapidly, land is finding its intrinsic level, so far as agriculture is concerned.

Agrigentum, now GIRGENTI, an ancient city on the S. coast of Sicily, colonised from Gela, 582 B.C. It throve as a free commercial city, till it rivalled Syracuse. Phalaris set himself up as tyrant, but was killed after a reign of fifteen years. Later on, Theron assumed the same position, and was successful in repelling the Carthaginians. He died in 472, and the democratic form of government was revived. The city at this period was adorned with magnificent public buildings, and was renowned for its beauty and luxury. The population was estimated at 200,000. In 406 the Carthaginians took the place, and swept away nearly every trace of its prosperity. Timoleon, in 340, re-colonised it with citizens from Velia; and after terrible vicissitudes during the Punic Wars, it ultimately fell into the hands of the Romans. On the fall of the Eastern Empire further disasters were experienced, and the Saracens became masters of the city. But few fragments of architecture now mark the site of this once large and powerful community.

Agrimony, the popular name of the small genus *Agrimonia*, in the order *Rosaceæ*. It includes eight or ten species, widely distributed, two being British. They are perennial herbs with pinnate,

AGRIMONY (*Agrimonia Eupatoria*).
(*Showing leaf and flower.*)

sometimes lyrate, leaves, and racemes of short-stalked, small, yellow flowers. The floral leaves are in fives, but there are only two carpels, and in some species, such as *A. odorata*, there are subsidiary rows of stamens. The rhizome is astringent and yields a yellow dye, and the bruised leaves are aromatic and reputedly tonic. *Hemp-Agrimony* is the popular name of the Composite *Eupatorium cannabinum*, a very different plant.

Agrippa, HENRY CORNELIUS, born at Cologne in 1486 of a noble and ancient family. Entering the service of the Emperor Maximilian as secretary, he fought in the Italian wars, but soon abandoned arms for learning. He visited France, Spain, and England, lecturing on theology, between 1507 and 1510. After a sojourn in his native place he again joined Maximilian in Italy, and lectured at Pavia and Turin. His opposition to monkish legends and to prosecutions for witchcraft brought upon him

the enmity of the Dominicans. He was driven out of Metz, where he held important municipal offices, and reports were spread as to his familiarity with the "black art." We find him successively dwelling at Cologne, Geneva, and Lyons, and for a time he enjoyed a pension from Francis I. of France, but losing the favour of the Queen Mother, took refuge with the Emperor Charles V. in the Netherlands, and became his historiographer. On the publication (1530) of two treatises upon *Occult Philosophy* and the *Vanity of the Sciences* he was again persecuted by the Inquisition, but Cardinals Campeggio and de la Marck protected him. Imprisoned for a time at Brussels, he next went to Bonn, and thence to Lyons, where he was once more incarcerated, this time for a libel on the Queen Mother He was released, and died at Grenoble in 1535. Though influenced by Luther, he remained till death within the pale of the Roman Church, and his writings show him to have been a Christian, with a tendency towards Quietist doctrines. He was thrice married.

Agrippa, HEROD. [HEROD.]

Agrippa, MARCUS VIPSANIUS, born in 64 B.C. He became the devoted friend of Augustus, and urged that prince after Cæsar's murder to put himself at the head of the State. We do not hear of him in the civil war that ensued, but he fought successfully in Persia and Gaul. Subsequently devoting himself to naval affairs, he created the Pontus Julius, trained a fleet, defeated Pompey in 36 B.C. (Virgil, *Æn.* viii. 682), and contributed largely to the later victory at Actium. After the Illyrian war he became Ædile, and raised magnificent public works, including the Pantheon. On the death of Marcellus he married his widow, Julia, the daughter of Augustus, who adopted his two sons Caius and Lucius. He visited Syria in 14 B.C., and died in Campania two years later. He prepared and published a valuable statistical survey of the Empire.

Agrippina the Elder, daughter of the foregoing, married C. Germanicus, and courageously shared in the fortunes of his campaigns, often aiding her husband by her sagacity and vigour. When Germanicus died at Antioch, she returned to Rome with his ashes. Tiberius, fearing her popularity, banished her to the island of Pandataria, where she was killed by his order. Caligula and Agrippina the Younger were her children.

Agrippina the Younger inherited much of her mother's ability, but combined with it boundless ambition and unparalleled vice. She married Domitius Ahenobarbus, and became the mother of Nero. After her first husband's death she married another, whom she poisoned in order to become the wife of her uncle, the Emperor Claudius. She murdered him, too, so as to make way for her son Nero, by whose order she was herself put to death in 59 A.D.

Aguas Calientes, a town in Mexico, 270 miles N.W. of the capital, important as a centre of inland trade, being situated between Zacatecas, Durango, San Louis Potosi, and Guadalaxara. Cotton fabrics are manufactured here; the soil is fertile, and the climate excellent. The town takes its name from two hot springs impregnated with copper.

Ague, or MALARIA, a fever characterised by recurring paroxysms in each of which a cold, a hot, and a sweating stage are present. When complete intermissions exist between the paroxysms we have to deal with intermittent fever, as distinguished from remittent, the more severe form, in which the fever only abates in severity but does not disappear between the attacks of shivering. The different varieties of intermittent fever have been classified according to the duration of the intermissions. Thus in quotidian ague there is a daily febrile paroxysm, in tertians the paroxysm occurs every third day, in quartans every fourth day, there being two clear days of freedom, and so on. Again, double tertians have been described in which ague fits occur every day, but those of the odd days present certain common characters, in which they differ from those of the even days. Ague is most common in tropical countries, but is limited tolerably definitely to certain spots, so that in many parts of the tropics it is unknown. It is now very uncommon for cases to originate in this country, though this was by no means true in former times. Agueish districts are frequently swampy, so that the affection is often known as marsh fever; the English expedition to Holland in 1794 was notorious for the extent to which the army suffered from remittent fever. The poison is probably manufactured in the soil of the agueish locality. It has been supposed to be associated with decaying vegetable matter, and was at one time held to be a gas. In 1879 Klebs and Tommasi Crudeli isolated from the soil of certain districts near Rome an organism, the bacillus malariæ, which they hold to be the active agent in the causation of ague. The most recent view is that the vera causa of malaria is the "plasmodium malariæ," a protozoon which is found in the red blood-cells of ague patients. Enlargement of the spleen is an almost constant phenomenon in attacks of ague, and in those in whom the disease assumes a chronic form some permanent increase in size of that organ may result. Various forms of neuralgia are also met with in old subjects of ague, of which "brow-ague" has received a special name. In the treatment of ague quinine and arsenic are the drugs of greatest value.

Aguesseau, HENRI FRANÇOIS D', born at Limoges in 1668, was carefully educated by his father in all branches of liberal learning, and was specially trained for the profession of the law. At the age of twenty-two he became "Avocat-Général" for the parliament or high court of Paris, where his eloquence and ability soon made him conspicuous. He exerted himself to uphold "Gallican liberties" against Papal encroachments in the case of Fénélon's censure; and in 1700 was made "Procureur-Général.' In this office he effected many useful reforms, fighting in vain against the famous bull "Unigenitus" (1713), by means of which the Jesuits sought to crush their opponents. After the death of Louis XIV. he was, in 1717, created Chancellor

of France. The next year, his opposition to Law's scheme and the influence of Cardinal Dubois led to his exile. He was recalled in 1720, and weakly lent his support to the registration of the Papal edict against which he had so boldly struggled. To satisfy popular discontent he was again banished, and spent five years in study. In 1727 he returned to Paris, and ten years later resumed the Chancellorship. He now devoted himself to legal reforms, and above all to the codification of the law. Retiring in 1750, he spent his last days in religious studies, dying in 1751.

Aguilar, GRACE, a lady of Jewish race, born at Hackney in 1816. She possessed considerable literary ability, and wrote several romances, a number of tales, and a few religious tracts. *The Vale of Cedars* and *The Days of Bruce* are the best known of her novels. The style is mock-heroic and dull. Her sketches after the manner of Miss Edgeworth hit the taste of her generation, and the titles, *Home Influence, The Mother's Recompense, Woman's Friendship, Home Scenes and Heart Studies*, indicate clearly enough their character. Among her more serious writings, *The Women of Israel* and *The Spirit of Judaism* are the most important. She died in 1847 at Frankfort.

Aguilar de la Frontera, a town in the province of Andalusia, Spain, 22 miles S.E. of Cordova, and on the left bank of the Cabra. It occupies the summits and bases of four low hills, and is clean and well built. The inhabitants are employed in agriculture, the breeding of sheep and cattle, and local industries.

Agulhas (Portug. *Needles*), the most southerly cape of Africa, is situated 100 miles S.E. of the Cape of Good Hope. Off the coast at this point is a vast bank, the *Agulhas Bank*, which extends for 560 miles, and has a breadth opposite the Cape of 200 miles.

Ahab, son of Omri, succeeded his father as King of Israel in 918 B.C., and reigned 22 years in Samaria. He married Jezebel, daughter of the King of Sidon, and was by her led into idolatry and luxury. Elijah, Micaiah, and other prophets, who boldly denounced his wickedness, incurred constant persecution. Twice he defeated the overwhelming hosts of Ben-hadad, King of Syria, with the help of God, but he spared his defeated enemy and incurred thereby Divine wrath. He was slain in battle by a chance arrow.

Ahasuerus, or ACHASVEROSH, a title borne in the Bible by four Median and Persian kings, the first of whom may be identified with Astyages, the second with Cambyses, the third with Xerxes or Artaxerxes Longimanus, and the fourth with Cyaxares I. The third is the most important. [ESTHER.] The "Wandering Jew" of legendary tradition bears this name.

Ahaz, the eleventh king of Judah, succeeded Jotham, his father, about 775 B.C., and reigned for 16 years. He allied himself with the King of Assyria against an invasion of the Israelites and Syrians, and Damascus, the Syrian capital, was taken by *Tiglath-Pileser. He was succeeded by his son Hezekiah.*

Ahmedabad, a district and city in Gujerat, in the Bombay Presidency, India. The latter is on the left bank of the Sooburmuttee, and 290 miles distant from Bombay, on the Bombay, Baroda, and Central Indian Railway. It was founded by Ahmed Shah on the site of Beder, or Ashawal (1413-1443), the capital of the Mohammedan province, possessing great wealth and many noble buildings. The mosque of Sultan Ahmed at the disruption of the Mogul Empire was fought for by Mussulmans and Mahrattas. Col. Goddard took the city in 1780, but it remained in the hands of the Mahrattas, who destroyed its prosperity, until 1818. Since that date a considerable revival has taken place under British rule. The earthquake of 1819 laid much of its architecture in ruins.

Ahmednuggur, a district and city in the province of Auzungabad in the Bombay Presidency, India. The city is on the river Seena, and is distant 122 miles from Bombay, on the Great Indian Peninsular Railway. Its ancient name, Bhingar, was changed by the Nizam Ahmed Shah (1494), who added new buildings. The eastern wall of Hussein Shah (1562), the mausoleum of Salabut Jung, and the palace of the Sultans still remain. About half a mile from the town is the fort, an oval stone structure nearly one mile in circumference. It was captured by Wellington in 1803, and in 1817 the whole place came under British rule.

Ahmedpoor, a town in the feudatory state of Bhawalpoor in N.W. India, about thirty miles S.S.W. from the capital, Bhawalpoor. It is inhabited chiefly by Mohammedans, and consists of mud houses, with a large mosque. A kind of gaily-coloured silk and cotton waist-band, called "loonghi," is made here.

Ahmed Shah, the founder of the Durani dynasty in Afghânistân, was born in 1724. He served in early life under Nadir Shah, and on the assassination of his chief escaped to his native country, where he was proclaimed king in 1747. He became possessed of the celebrated diamond, the Kohinoor. In 1748 he invaded the Punjab, which he annexed, together with Kashmir. In 1757 he pushed on as far as Delhi, took the city, and held it for some time against the Sikhs and Mahrattas. He utterly routed the latter in 1761 at the battle of Paniput. Being then recalled to Kabul by troubles at home, he left the Punjab to the Sikhs, and devoted the rest of his life to spreading his conquests westward to the Caspian Sea. His death occurred at Murgha in 1773, and his son Timir succeeded to a vast empire, which was speedily broken up.

Ahriman, Arimanes, in the Zend-Avesta, the principle of evil, symbolised by darkness, and opposed to Ormuzd, the principle of good, symbolised by light. According to the Magians, both existed from eternity, though Zoroaster himself seems to have taught that only the latter was eternal and that the former was a created being. The Zend-Avesta says that this world will be for

12,000 years the scene of a fierce conflict between these principles, but that good will finally triumph over evil.

Ahwas, a town in Persia on the river Karûn, occupying the site of the ancient Aginis, of which many ruins still exist, amongst them being the *bund*, or stone dyke that dammed the river, and supplied the now desolate country with water. The population is reduced to a few hundred Arabs.

Ai. [SLOTH.]

Aid, the term given to the payments, originally voluntary, made by a tenant to his lord under the feudal system. Aids afterwards became compulsory, and were exacted (1) for the ransom of the lord, (2) the expenses of marrying his eldest daughter, or (3) of making his eldest son a knight. This tax was abolished in 1672.

Aid was also used as the name for a subsidy granted to the king by Parliament as part of his revenue. [SUPPLIES.]

Aide-de-camp, the name given to a military officer who conveys the orders of a general to other officers. In times of peace he acts as a secretary and assistant to the general.

Aidin, or GUZEL-HISSAR, a town of Asiatic Turkey, in the pashalic of Anatolia, 70 miles S.E. of Smyrna, with which it is connected by railway. It is pleasantly situated on the famous Meander, and the ancient *Tralles* stands on a neighbouring hill. The district is very fertile, and produces great quantities of figs, which are dried and exported to Europe. A good general trade is done in the bazaars.

Aigues Mortes (AQUÆ MORTUÆ), so called from the neighbouring lagoons caused by the mouth of the Rhone, a town in the department of the Gard, France. It is 3 miles from the Mediterranean, and 21 miles S.W. of Nimes. The inhabitants are principally occupied in fishing, and the produce is exported *viâ* the Grand Roubine Canal.

Aikin, JOHN, biographer and popular scientific writer, was born at Kibworth Harcourt, Leicestershire, on January 15th, 1747; was educated at the Warrington Academy, at the University of Edinburgh, and under Dr. William Hunter in London, and graduated M.D. at Leyden, in 1784. Not being very successful as a physician, he devoted himself to literature. In 1780 he had published *Biographical Memoirs of Medicine*, and between 1792 and 1795, in conjunction with his sister, Mrs. Barbauld, issued six very popular volumes entitled *Evenings at Home*. From 1796 to 1807 he edited the *Monthly Magazine*, and from 1807 to 1809 a short-lived *Athenæum*. Besides various separate biographies, he published between 1799 and 1815 a *Biographical Dictionary* in ten volumes. He died at Stoke Newington, 7th December, 1822. There is a memoir of him by his daughter, Lucy Aikin, with an engraved portrait by Englehart, and there is also an engraving of him by Knight, after J. Donaldson, and a silhouette in Kendrick's *Warrington Worthies*. The genus *Aikinia* was dedicated to him by Salisbury. His son, Arthur (1773-1854), was secretary to the Society of Arts from 1817 to 1840, and was well-known as a geologist. His daughter, Lucy, mentioned above, was born in 1781, and died in 1864. She was a well-known historical writer, and author of a *Life of Addison*, *Lorimer: a Tale*, and other works.

Aikman, WILLIAM, a portrait painter of eminence, born at Cairney, Aberdeenshire, in 1682. He studied under Sir John Medina, in Scotland; then visited Rome, Constantinople, and Smyrna, returning in 1712. For ten years he worked in Edinburgh under the patronage of the Duke of Argyll, and in 1723 moved to London. There he speedily attained a high position, and became the friend of Swift, Pope, Gay, Thomson, and the leading literary men of the day. He modelled his style upon that of Kneller, and his portraits of Gay, Thomson, Fletcher of Saltoun, and W. Carstairs attest his ability. He died in 1731, whilst engaged on a picture of the Royal Family, and Thomson wrote some lines to his memory.

Ailantus, a genus of trees belonging to the order *Simarubeæ*, natives of tropical Asia. The best known is *A. glandulosa*, a native of China, cultivated in many temperate climates, and frequently found in gardens and plantations in England. In Japan it is known as "ailanto;" in Italy as "albero di paridiso;" and in Germany as "Götterbaum." It reaches a height of 50 or 60 feet, and has large alternate pinnate leaves, and compound racemes of small dicœcious flowers. These have five sepals, five involute petals, and ten stamens, all hairy at their bases, and five winged, one-seeded carpels forming a samaroid fruit. Its leaves are the food of the Asiatic silkworm, *Bombyx cynthia;* but in England it is only grown for ornament, and in the eastern United States for shade. It grows rapidly even in bad soil, enduring either heat or drought, and sending out spreading roots which sprout into suckers.

Ailsa Craig, a rocky islet in the mouth of the Firth of Clyde, remarkable for the abruptness with

AILSA CRAIG.

which it rises from the sea, its height being 1,139 feet. Geologically it is composed of a jointed

grey syenite, and it has a cave on the north side. Vast swarms of sea-birds haunt the spot, and a ruined tower shows that it was once occupied by man.

Ailurus. [PANDA.]

Aimard, GUSTAVE, a French writer of fiction, whose works occupy much the same position as those of Captain Mayne Reid in England. He was born about 1818, and spent his early life in America, where he travelled and hunted. He also visited Spain, Turkey, and the Caucasus. *Les Trappeurs de l'Arkansas*, *Le Cœur Loyal*, *Les Aventuriers*, *Les Bisons Blancs*, and others of his spirited romances, have been translated into many languages. M. Aimard was an officer in the Garde Mobile as early as 1848, and in 1870 he organised a corps of Francs-tireurs that fought bravely at Le Bourget. He died in 1883.

Ain, one of the Eastern departments of France, lying between Jura, Saône-et-Loire, and Rhône to the N. and W., Herè to the S., and Savoie and Switzerland to the E. Its greatest length and breadth are 52 miles, and its area 2,241 square miles. Mountainous in the E., the country trends into level plains to the W. and S.W., and is watered by the Rhône and its affluents, the Ain and the Saône. The valleys and plains are fertile, producing all kinds of cereals, fruits, and wine. On the higher slopes are valuable forests, and the mountains are rich in such products as potter's clay, building and lithographic stone, asphalt, and iron. Bourg is the chief town, and Belley is the seat of a bishopric.

Ainhum, a disease affecting the negroes of South America and the west coast of Africa. The name is derived from a negro word meaning to saw, because a constriction presents itself, most frequently on the little toe, which gradually deepens until the peripheral portion, that beyond the groove, becomes in time actually separated. The course of the disease is very slow.

Ainmüller, the reviver of the art of glass-painting in Germany, was born at Munich, 1807, and having devoted himself early to this art, became in 1828 director of the royal factory. His process of enamelling a design painted upon the glass was a recurrence to the practice of the Renaissance, and speedily found favour. Specimens of Ainmüller's work may be seen in the cathedrals of Cologne, Ratisbon, Glasgow, and St. Paul's, and in Nôtre Dame at Munich. He was a skilful painter in oils, especially of architectural interiors, and his pictures of St. George's Chapel, Windsor, and Westminster Abbey are fine works. He died in 1870.

Ainos, the aborigines of Yezo, South Sakhalin, and most of the Kurile Islands, and formerly widely diffused throughout the whole of Japan and the lower Amur basin, where they are still represented by the Ghiliaks. The Ainos, *i.e.* "Men," are absolutely distinct in physique and speech from the surrounding Mongolic races, forming an isolated ethnical group, apparently of Caucasic stock, but with no known or certain affinities elsewhere; taller than the Japanese and well made, with regular, almost European features, light-brown complexion, somewhat wavy black hair, very full beard and hirsute bodies, whence their Japanese name, *Mozin*, from the Chinese Mao-shin ("hairy body"). They are a gentle, inoffensive people, possessed of considerable intelligence, but still in the fishing and hunting state, living in rude huts like those in the remoter uplands of Japan, forming small monogamous family groups rather than tribes, paying much respect to their women, choosing as head of the group some person distinguished by age or wealth, but exercising little absolute control. They venerate as divinities the sun, moon, sea-god, and all striking natural phenomena, worshipped under the form of simple symbols, with sacrifices and offerings. The dress is a short-sleeved smock reaching a little below the knee, made of bark-cloth in summer, of fur or sealskin in winter, and of like form for both sexes. All go bareheaded, the women allowing their abundant hair to fall loosely over the shoulders. The pure Aino race, now reduced to about 15,000, appears to be dying out; but a population of half-breeds has sprung up along the shores of Yezo by alliances with the Japanese. A party of Ainos visited London in 1910.

Ainsworth, HENRY, born near Blackburn, Lancashire, about 1560. He went to Cambridge, and there adopted the tenets of the Brownist sect of Independents. Driven from England for his views, he appears to have lived in great poverty at Amsterdam. When the Brownists built a church there, Ainsworth and Francis Johnson took charge of it, and published a Confession of Faith that set forth the claims of the Independents to religious liberty. For many years Ainsworth was engaged in the bitter controversies waged between the Nonconformists and their opponents. In this strife his profound knowledge of Hebrew, his cultured intellect, and his high personal character gave him great advantage. He died at Amsterdam about 1623, and is said to have been poisoned.

Ainsworth, ROBERT, born near Manchester, 1660. He realised a competency by keeping a school first at Bolton, subsequently in the neighbourhood of London, and the latter part of his life was devoted to the compilation of *Ainsworth's Dictionary*, a book that for nearly a century held its own in schools and colleges, though full of serious imperfections. He died in 1743.

Ainsworth, WILLIAM HARRISON, born at Manchester, 1805. His first novel, *Rookwood*, appeared in 1834, and—combining as it did considerable descriptive power and some archæological knowledge with a romantic, not to say sensational, plot—attracted popular favour at once. This was followed by *Jack Sheppard*, *The Tower of London*, *Old St. Paul's*, *Windsor Castle*, and many other romances in the same style, numbering over thirty volumes. Ainsworth also wrote articles and poetry for various magazines, and was the proprietor first of *The New Monthly*, and afterwards of *Bentley's Miscellany*. Notwithstanding the immense success of his books, Ainsworth was not prosperous, and he died almost in poverty at the age of 77.

Ain-Tab, a garrison town of some importance in Syria, about 65 miles N.N.E. of Aleppo. It has a trade in hides, leather, and cotton.

Air. [ATMOSPHERE.]

Air, in *music*, a rhythmical melody or succession of notes as opposed to a harmonic combination. The air used to be divided into two classes—the aria da capo, and the aria without da capo; the term is now, however, frequently applied to the leading melody in a composition, whether vocal or instrumental.

Air-bed, as the name implies, a bed consisting of air-tight cloth or indiarubber inflated with air. They are useful for invalids and in cases of sickness, and can be easily transported, but as the air gets heated by the warmth of the body they are not so good as water-beds.

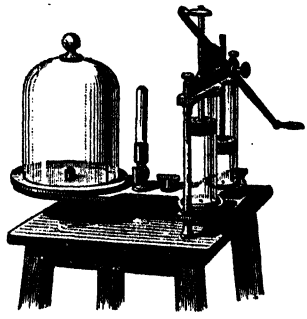
Airdrie, a burgh and market town in Lanarkshire, Scotland, 11 miles E. of Glasgow, on the high road to Edinburgh. The place depends for its prosperity on the iron and coal mines in its vicinity. Cotton-mills, foundries, and other manufactories have been established there. It was formerly grouped in Parliamentary representation with Falkirk and other boroughs, but is now merged in the county division.

Aire, the name of two French towns. 1. In the Pas de Calais, 10 miles S.E. of St. Omer, possessing barracks and manufactories of hats, cotton, wool, soap, etc. Pop. about 9,000. 2. In the Landes, on the left bank of the Adour, the ancient capital of the Visigoths, and the seat of a bishopric.

Aire, a river in Yorkshire, joining the Ouse above Goole. Leeds is on its banks.

Air-engine, an engine worked by means of the expansion of air when heated. Cold air passes through a furnace, becomes greatly heated, and thereby expands. Its expansion is made to drive a piston forwards in a cylinder; the air is then passed off to the exhaust or to a regenerator, and a fresh supply drives the piston back. This reciprocating motion of the piston is converted into a rotatory motion by means of a connecting rod and crank, and continuous motion is so produced. Great economy of heat is effected, there is no liability of expense, and management is easy. But air-engines, though theoretically efficient, have not hitherto been quite successful in practice. The high temperature of the air causes it to burn away the less durable working parts of the machine, and the constant repairs necessary diminish the practical efficiency.

Air-pump, a machine invented by Otto von Guericke of Magdeburg, in 1654, for the removal of the air or other gas from a closed cavity. The principle of most air-pumps is as follows:—A cylinder, with a closely fitting piston, is connected at its lower end with the receiver or enclosed volume of air, by a pipe. On working the pump-handle the piston moves downwards, and a portion of the air effects a passage through a valve in the piston. On the return of the piston this valve closes so that no more air passes through, whereas that portion which effected the passage is driven out of the cylinder through another valve at its upper end. Repetition of the motion therefore draws more and more air from the receiver.



AIR-PUMP.

The Sprengel air-pump, which is far more efficient, depends on a totally distinct principle. Mercury falling down a vertical tube connected laterally with the receiver is found to drag small bubbles of air with it until a very perfect vacuum is obtained. The apparatus has been used with great success in cases where almost complete exhaustion is required; as, for instance, in incandescent electric lamps.

Aisle, the wing or side passage in a church, attached either to the nave, transepts, or chancel. In English churches there are generally only two aisles, and in small churches only one; but in many of the continental churches the number of aisles is greater, Antwerp Cathedral having six, and Notre Dame, Paris, seven.

Aisne, a department on the N.E. frontier of France, S. of Belgium and W. of the Ardennes. Its greatest length is 75 miles, and its greatest width 53 miles, the area being 2,838 square miles. Comprised within its limits are parts of Picardy and the Isle of France. Laon is the chief town, and Soissons the seat of the bishopric. Other important places are St. Quentin, Vervins, Hirson, and Chateau Thierry. The undulating plains that stretch up to the hilly part of the Ardennes produce abundance of wheat, barley, oats, rye, flax, beets, fruit, and potatoes. Numbers of cattle and horses are reared in the pastures. The wine is not good. Much of the country is wooded, and building-stone, as well as slate, is quarried. The industrial products are very considerable, and include muslin, shawls, glass, iron, sugar, and pottery. An interesting and important experiment in co-operative production on Socialistic lines is being carried out at Guise, where 1,200 men are employed in M. Godin's ironworks.

Aiton, WILLIAM, first director of the Royal Gardens at Kew, was born near Hamilton, in Scotland, in 1731. In 1754 he entered the Chelsea Physic Garden under Philip Miller, and in 1759, was appointed director of the newly-established Botanic Gardens at Kew, where he remained till his death, 1st February, 1793. In 1789 he published the *Hortus Kewensis*, a catalogue in three volumes, arranged on the Linnæan system, which was mainly

the work of Dryander and Solander, two Swedes, pupils of Linnæus, settled in England under the patronage of Sir Joseph Banks. There is an oil portrait of Aiton at Kew. His son, William Townsend Aiton (1766—1848), succeeded him, and between 1810 and 1813 issued a second edition of the *Hortus Kewensis*, in which he was assisted by Robert Brown.

Aix, the *Aquæ Sextiæ* of the Romans, an ancient city giving its name to an *arrondissement* in the department of the Bouches-du-Rhone, France. Its hot springs were valued by the Romans, but are not much used at present. Aix was renowned as a seat of learning under the Counts of Provence, and still possesses a fine library and an academy. There are in the streets many interesting specimens of architecture, Roman and mediæval. Cotton and silk manufactures exist, and a large trade is carried on in corn, wine, and oil.

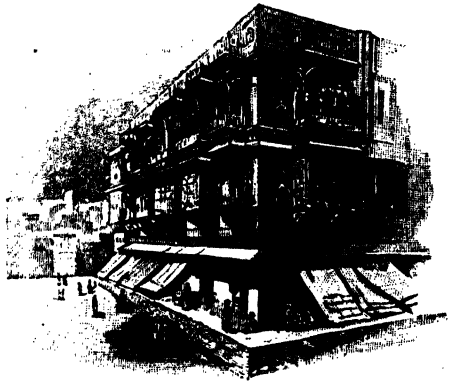
Aix-la-Chapelle. [AACHEN.]

Aix-les-Bains, in the department of Savoie, France, on the Lake Bourget, eight miles N. of Chambéry. The efficacy of its hot mineral springs impregnated with sulphur and soda was well known to the Romans, and all the gouty, rheumatic, and dyspeptic sufferers that can afford the treatment flock thither at present from every quarter of the globe. Royal patients give the place a fashionable prestige that increases the swarms of annual visitors. The town is charmingly situated and well kept. Splendid hotels and villas have sprung up of late, and society finds amusement there, as at Hombourg.

Ajaccio, the chief town of the French island of Corsica, is situated on the W. coast, and has a commodious and safe harbour. It is well built, and contains all the buildings connected with the administration, as well as a bishop's palace and a School of Hydrography. The house in which Napoleon Bonaparte was born (1769) is still extant. The trade of the place is principally in wine, oil, fruit, anchovies, and coral.

Ajax, the name of two Homeric warriors, between whom there appears to have been no kinship. 1. The "Great" Ajax was the son of Telamon and King of Salamis. There was in the *Iliad* nothing to connect him with Attica until Solon inserted a spurious line (ii. 557), after which he was adopted as an Athenian hero and a theme for dramatists. Renowned in Homeric times for physical might, sturdy courage, and manly beauty, he is deficient, perhaps, in the finest and noblest qualities of the hero. His defeat by Ulysses in the competition for the arms of Achilles led him to quarrel with that king and with Athena. The goddess afflicted him with madness, which resulted in his slaying himself, as related by Sophocles in his tragedy. 2. The "Lesser" Ajax, son of Oileus, King of Locri, is extolled by Homer for his swiftness of foot and his courage, but he was haughty and insubordinate. According to the Epic legend, he lost a race with Ulysses (*Il.* xxiii. 754—784), incurred also the enmity of Athena and was wrecked on his homeward voyage (*Od.* iv. 499). Other stories relate that the goddess was offended by his assault on Cassandra, and that he put out to sea in a small craft and was drowned.

Ajmere, a district and town in Rajpootana, British India. The district (Ajmere Merwara), 80 miles in length by 50 in breadth, has an area of 2,057 square miles, and a pop. of about half a million, the majority being Hindoos. Towards the E. the country is flat or undulating, and produces cereals, sugar, maize, oil-seed, tobacco, and cotton. In the N.W. the Aravalli range presents rugged valleys, with sandy deserts and occasional spots of fertility.



THE PALACE OF AKBAR, AJMERE.

There are no rivers of consequence and no manufactures. The city is in the mountainous district on the Taragarh Hill, and is surrounded by a stone wall with five handsome gates. There are palaces built by Akbar and Jehaugir, a venerable Dargab, and a fine Jaire temple. The Anasagar Lake, artificially formed, supplies water. It is a clean and well-built city, and was founded in 145 A.D. by Aji, whose descendants ruled independently, or as vassals of Delhi, till 1365. For two centuries the chiefs of Mewar and Marwar disputed its possession. Akbar then conquered it, and the Moguls retained it till 1770, when the Mahrattas became its master. Ultimately the British purchased the city in 1818. The trade is principally in salt and opium. The agent for Rajputana has his residence here, and there is a thriving college.

Akabah, THE GULF OF, is the E. bifurcation of the Red Sea at its N. end. It extends for 100 miles with a breadth of 12 to 17 miles. The steep mountains of Arabia Petræa hem it in, and the Golden Port, 29 miles E. of Mount Sinai, is the only safe harbour. Akabah, a village near its head, is supposed to be the ancient Elath, and some ruins in the sea close by are conjectured to mark the site of Eziongeber.

Akbar, JELLALADIN MOHAMMED, was born in Sindh in 1542, and succeeded his father Humayun as Mogul Emperor in 1556. He found that his realms were disorganised and his authority

impaired by revolts and disaffection. By conquest and by conciliatory methods he succeeded, during a long reign of nearly half a century, in consolidating the empire on a firmer basis than before. Justice, moderation, and sympathy, were the characteristics of his policy. He even had the strength of mind to cast aside Musulman bigotry and adopt a purer Deism. He was a liberal patron of literature and had many Sanscrit works, and perhaps the Gospels, translated into Persian. The misconduct of his two eldest sons, who died through intemperance, and the rebellion of the third, Selim, afterwards the Emperor Jehangir, embittered Akbar's last days. He died at Agra in 1605, and was buried at Secundra.

A Kempis, THOMAS, the author of *De Imitatione Christi*, was born at Kempen (whence he took his name) about 1380. The greater part of his life was spent in a monastery at Zwolle, near the Zuyder Zee. Here he became sub-prior in 1429 and remained there until his death in 1471. Some critics affirm that he was only the copyist of the *Imitatio Christi*, but it seems to be now agreed that he was actually the author of this, one of the most beautiful of devotional books.

Akenside, MARK, poet and physician, was born at Newcastle-on-Tyne in 1721, his father being a butcher and a Dissenter. He was educated at the Universities of Edinburgh and Leyden, and took the degree of M.D. in 1744, in which year he published his chief poem, "The Pleasures of the Imagination." Pope had read it in manuscript and praised it, and Johnson highly commended the intellectual ability of the poet and his skill in blank verse. By the generous help of Jeremiah Dyson the author started in medical practice at Northampton, moving later on to Hampstead, then to Bloomsbury Square, and lastly to Burlington Street. His vanity and overbearing disposition made enemies, but his undoubted abilities caused his speedy professional advancement. He became physician to St. Thomas's Hospital and to the Queen. Among other poetical works his Odes, and Epistles to Warburton and Curio, deserve notice. He died of putrid fever in 1770. Smollett drew him in the character of "The Doctor" in *Peregrine Pickle*.

Akers, BENJAMIN PAUL, an able American sculptor, born in Maine, 1825. He went to Rome in 1855 and spent some years there in study. His best works are busts of Everett and Longfellow, and a head of Milton. He died in 1861 at Philadelphia.

Akhalsikh, a city of Georgia in Transcaucasian Russia, 110 miles W. of Tiflis. A large trade is carried on in silk, honey, and wax. There is a strong castle, a college, library, and mosque. Pop. mostly Armenians.

Ak Hissar, anciently Thyatira, a mud-built town in Anatolia, Turkey in Asia, 58 miles N.E. of Smyrna. Cotton is grown in the district and scarlet dyes are produced. Many ruins of the Greek city exist.

Akhtyrka, a town in the Ukraine, Russia, 45 miles N.W. of Kharkov. There is an image of the Virgin which is much venerated, the neighbourhood is rich in fruit, and an annual fair is held in May.

Akiba, BEN JOSEPH, a famous Jewish Rabbi, who lived in the first and second centuries of the Christian era. He was a very popular teacher at Jaffa, and is believed to have influenced the doctrines of the Talmud. Having joined the false Messiah, Bar-Eskeba, he was flayed alive by the Romans under Julius Severus at the age of 120. He is still venerated as a martyr. Only one of the books attributed to him appears to be genuine.

Akkas, the northernmost group of the Negritos, a dwarfish negro population, which are scattered in isolated communities over a great part of the Central African forest zone. The Akkas appear to be confined chiefly to the region stretching south from Monbuttuland about the head waters of the Welle. They have been carefully studied by Dr. Schweinfurth, who met some of them at the court of the Monbuttu king Munza, and by Miani, who brought two of them to Italy in 1874. The Akkas are taller than the more southern Negritos, averaging about 4 feet 9 or 10 inches in height; but they are specially remarkable for their disproportionately large heads, which seem to be insufficiently supported by a small slender neck. The features are also of a highly-pronounced negro type, with projecting upper teeth, everted lips, and exaggerated prognathism, giving them a strong simian appearance. They are a quick, nimble people, using both lance and bow and arrow skilfully, and are consequently often employed by the Monbuttus to hunt the elephant, which they face fearlessly. Yet they walk with the toes turned inwards, in this respect differing from all their neighbours. Next to nothing is known of their social condition and domestic habits, as they have never been visited in their homes. But according to their own account, the Akkas, known also as Tikki-tikki, are a hunting people, living exclusively in the forests, and possessing no domestic animals except poultry. Their nearest congeners are the pygmy people discovered in 1888 by Stanley in the dense forests of the Aruwimi valley.

Akmollinsk, a province and capital city of Asiatic Russia, situated N. of 50° lat. and E. of 70° long. The province has an area of 225,074 square miles, and a pop. of 787,800 (1906). It was formed by ukase in 1868. The city is on the river Ishim.

Akron, the capital of Summit County, Ohio, U.S.A., 36 miles S. of Cleveland, on the Atlantic and Great Western Railway and the Ohio, Erie and Pennsylvania canals. Wheat and mineral fire-proof paint are largely exported thence, and extensive manufacturing industries carried on.

Aksu, a garrison town of Chinese Turkestan, 250 miles N.E. of Yarkand, the centre of a large caravan trade. It is noted for the manufacture of the richly ornamented deer-skin saddlery so esteemed in Central Asia, and it has some manufactures of cotton, besides copper and iron mines worked by Chinese convicts. The pop. of the district is about 100,000.

Akyab, a district and city in the Aracan division of British Burmah, stretching along the Bay of Bengal between 20° and 21½° N. lat. and 92° 12′ and 94° E. long. Its area is 4,858 square miles, not more than a quarter being capable of cultivation. The fertile portion borders on the Myu, Koladyne, and Lemyu rivers, and produces vast quantities of rice, that goes down to the port of Akyab for exportation. The district came into British hands after the war of 1825. The inhabitants are mostly Buddhists.

Alabama, one of the states of the North American Republic, situated on the N. shore of the Gulf of Mexico, and bounded W. by Mississippi, N. by Tennessee, and E. by Georgia. It extends N. 330 miles and has an average breadth of 154 miles, and an area of 50,722 square miles. The Alleghany Mountains skirt the N. of the state, and the centre is hilly, but for 60 miles inland from the sea an almost dead level prevails. To the N.E. the country is watered by the Coosa and Talapoosa, which unite just above Montgomery, the capital, to form the Alabama. The latter, flowing S.W., joins the Tombigbee 45 miles above Mobile, and the united stream is called the Mobile river. The climate is subtropical, but healthy on the higher levels. The soil is fairly productive, and cotton, sugar, and tobacco thrive as well as cereals, cattle, and timber. Iron and coal are abundant and of good quality, but little worked as yet. Discovered by De Soto 1541, the country was occupied by the French 1711, ceded to England 1763, and admitted as a separate State 1819.

Alabama, the name of a vessel built at Liverpool which served as a privateer in the service of the Southern States in the American Civil War in 1862. In 1864, after doing much damage to the North, the *Alabama* was sunk. After the conclusion of the war, compensation was claimed from England, and by the decision of the Geneva tribunal, to which the claim was referred for arbitration after many vain attempts at settlement, and when the relations between the two countries had become very strained, America obtained, in 1872, an award of over three millions sterling.

Alabaster, a name (said to be of Arabic origin and to signify "white stone") properly restricted to the translucent or semi-opaque massive varieties of gypsum or hydrous calcium sulphate ($CaSO_4 + 2Aq.$). When pure it is white, with a pearly lustre. A yellow variety known as "alabastra agatato" occurs at Siena. The mineral is not uncommonly fibrous in texture, and is then silky in lustre, and is called "satin-spar." Being very soft, capable in fact of being scratched with the finger-nail, it is readily carved or turned into statuettes, vases, and other ornamental articles. It is not uncommon, occurring in thick beds with the more earthy variety of gypsum, which is quarried for the manufacture of plaster of Paris. Derbyshire and Staffordshire are the chief counties in England in which it is worked. Florence has long been the centre of the alabaster trade of the world, the mineral being abundant in Tuscany, and at the time of the Renaissance it became a favourite material for tombs and other sculpture. Being slightly soluble it is not suited for out-door use, and though its softness makes it comparatively cheap, it is hardly durable enough for work of permanent value. The name "Oriental alabaster," "Algerian onyx," or, "onyx marble," is applied to a stalagmitic variety of calcium-carbonate, a slightly harder and entirely distinct substance, generally clouded in concentric curves with shades of brown, and long quarried in Oran, Algeria.

Alagoas, a province and city of Brazil. The province is situated on the coast between Pernambuco N. and Sergipe S., being bounded on this side by Rio San Francisco. It extends inland 150 miles, and has an area of 15,036 square miles. The upper districts are mountainous and thickly wooded. Fine timber, dye-woods, and drugs are the products here, whilst the alluvial plains near the coast yield cotton, sugar, rice, and tropical fruits. There are no manufactures. The city stands on the shore of L. Manguaba. It is now insignificant, and Maceio is the capital.

Alais, a French town in the Department of the Gard, on the right bank of the Gardon and at the base of the Cevennes Mountains, 25 miles N.N.W. of Nimes on the Paris, Lyons, and Mediterranean Railway. Once the stronghold of French Protestantism, it was captured in 1629 by Louis XIII., and Louis XIV. built a fortress there. It is now the centre of a busy mining district. Iron, zinc, lead, and manganese are smelted there; coal is plentiful; silk, ribbons, glass, and vitriol are manufactured. There are cold mineral springs that attract visitors.

Alajuela, a city in Costa Rica, Central America, about midway between the E. and W. coasts in 10° 5′ N. lat. It does a considerable trade with the coast, and produces some sugar.

Alamos, Los, a town of the province of Sinaloa, Mexico, standing in a barren plain, but surrounded by silver mines.

Åland Islands, 300 in number, form an archipelago at the mouth of the Gulf of Bothnia. Only 80 are inhabited, the rest being barren rocks of granite, outliers in fact of the ridge that runs along the coast of Finland. The inhabitants, numbering 16,000, are of Swedish origin, but since 1809 have been under Russian rule. They are hardy and industrious raising crops enough to satisfy their needs, rearing cattle and making butter and cheese for exportation, catching and curing quantities of fish. Åland, the chief of the group, is 18 miles by 14 miles. The fortress of Bomarsund, destroyed in the Russian war 1854, is on one of these islets.

Alarcon, Hernando de, a Spanish explorer who in 1540 completely surveyed the coast of California and discovered that it was a peninsula.

Alarcon y Mendoza, Juan Ruiz de, a distinguished Spanish dramatist, born in Mexico some time before 1600. In 1628 received a government post in Madrid and began publishing his comedies. His haughty contempt for the public and for his

literary contemporaries led to his neglect, though his works were freely pillaged by other playwrights. After his death, which some assign to 1639, his merits were acknowledged. Corneille borrowed for *Le Menteur* from his play entitled *Suspicious Truth*, and some of his pieces are still acted, as, for instance, *Walls have Ears*, *Trial of Husbands*, and *The Weaver of Segovia*.

Alaric I., King of the Visigoths, born about 350 A.D. Until the death of Theodosius he served that sovereign as commander of the subjected Goths, but revolted (395) against Arcadius, invaded Greece and took several cities, including Corinth. Checked by Stilicho, he made peace and once more entered the imperial service. In 402 he broke loose again and was defeated by Stilicho at Pollentia and Verona in Italy. On the death of the Roman general Alaric renewed his invasion and, meeting with little resistance from the emperor, Honorius, marched to the gates of Rome, and was only prevented from entering the city by payment of a large ransom in 408. Honorius, who had retired to Ravenna, refused to fulfil the conditions of peace, and Alaric some months later seized Ostia, deposed Honorius, and set up Attalus in his stead. However, Honorius had to be restored, and broke faith with Alaric by inciting Sacus to attack the Goths treacherously. Thereupon Alaric took and pillaged Rome, 410, sparing the churches and public monuments, and endeavouring to moderate the fury of his followers. He next marched S. to invade Sicily, but died at Cosenza before the end of the year. His treasures were said to have been secretly buried in a river-bed along with their master.

Alaric II., a king of the Visigoths in Spain, who succeeded his father Euric about 484. His dominions reached as far as the Rhone and Loire. An Arian himself, he was very tolerant of orthodox Catholicism. His endeavours to live at peace with the Franks were frustrated by Clovis, who desired to annex the Gothic provinces of France. On religious pretexts war was declared and Alaric was defeated near Poitiers and killed by the hand of Clovis himself, 507.

Alarm, or ALARUM (Ital. *all 'arme*, to arms), either a call to arms by means of a trumpet, as in Shakespeare's historical plays, or a mechanical contrivance, generally in the form of an attachment to a clock, which awakens sleepers at any particular hour they may desire.

Ala-Shehr, a city in the pashalic of Anatolia, Asiatic Turkey, 77 miles E. of Smyrna. It is on the site of Philadelphia, one of the Seven Churches of Asia, and until 1390 it offered a stubborn resistance to the Turks. A Greek archbishop is established there.

Alaska, a territory of the United States, to which it was ceded by Russia in 1867 for a payment of $7,200,000. It comprises not merely the peninsula that bears the name but a vast tract 1,100 miles long and 800 miles wide, with an area of 590,800 square miles. A line drawn N. from Mount St. Elias along the 141° W. long. to the Arctic Ocean would cut off the territory from the continent of N. America, but in addition to this there is a narrow strip some 50 miles in breadth that extends down the Pacific Coast to British Columbia. The coast-line is not less than 7,860 miles, and there are innumerable islands. The principal river, the Yukon or Kwichpak, rises in British America, receives the Porcupine and other large tributaries and empties an enormous body of water into the sea near Norton Sound. The Copper river, the Suschitna, the Mischagak, etc., fall into the Pacific, and the Colville into the Arctic Ocean. The mountain range that runs all along the Pacific shore is prolonged into Alaska, and besides Mount St. Elias (14,970 ft.) has several other active volcanoes. The wealth of the country consists in fur-bearing animals, timber, and fish, for it is too cold and wet for agriculture. Gold, silver, and copper is worked; also lead, iron, and coal. Sitka in the island of that name, lat. 57° 3′ N. (average temperature 42° Fahr.), is the seat of government, which is purely military. Other settlements are Fort Nicholas on Cook's Inlet, and Fort St. Michael on Norton Sound.

Ala Tau, a name borne by three distinct mountains or ranges (1) in Ufa, to E. of Russia in Europe; (2) in Persia, N.W. of Meshed; (3) in Asiatic Russia to the S.E. of Lake Balkash, and in the neighbourhood of Lake Issik-Korel—separating the province of Semirayachentsk from Chinese Tartary. This range is itself subdivided into several parts, as Ala Tau Dzungar, Ala Tau Koungei.

Alatyr, a town and river in the province of Simbirsk, European Russia, on the confluence of the rivers Sara and Alatyr. It has an extensive commerce in grain.

Alava, DON MIGUEL RICARDO D', a Spanish general and politician, born in 1771. He was first in the navy. When Joseph Bonaparte usurped the Spanish throne from Ferdinand VII. he accepted him as king, but in 1811 joined the party of independence. Ferdinand on being restored imprisoned him, but subsequently set him free and made him ambassador to the Hague. In the revolution of 1820 he was a member of the Cortes, and later on President. He negotiated with the French for the return of Ferdinand; but, when that was effected, found himself compelled to fly to England. He took up the cause of Maria Christina and in 1834 was appointed ambassador to London, being transferred to Paris next year. After the insurrection of La Granja he retired to France, and died at Barèges in 1843.

Alava, one of the Basque provinces in Spain, having Navarre to the E. and Burgos and Logrono to the W. and S.W. Its area is about 1,200 miles. The Ebro, the Zadora, and the Ayuda skirt its W. borders. The country is very mountainous, with fertile valleys. There are large forests and an abundance of iron, copper, lead, and marble. The capital is Vittoria.

Alb, the name given to a long vestment of white linen worn by officiating priests in the Roman Catholic Church. It reaches to the feet, and has sleeves which reach to the wrist. It was used

formerly by those who had been newly baptised, whence the first Sunday after Easter, when they wore it, was called *Dominica in albis*.

Alba, the ancient Alba Pompeia, a city in N. Italy on the Tanaro river, 30 miles S.E. of Turin. It has a cathedral and a bishop. A large trade in cattle is carried on here.

Albacete, a province of Spain, with an area of 5,971 square miles, comprising the N.W. portion of the old kingdom of Murcia. The chief town, Albacete, is situated on the railway from Madrid to Alicante. Where it is not mountainous, the country is tolerably fertile, and produces cereals, fruit, wine, saffron, and honey. The bulls of the province are famous, and its horses are largely used by the Spanish cavalry. The town of Albacete is noted for the manufacture of cutlery.

Albacore, a sailors' name for species of the genus Thynnus met with in the Pacific Ocean, where ships cruising slowly are often attended by myriads of these fish. [BONITO.]

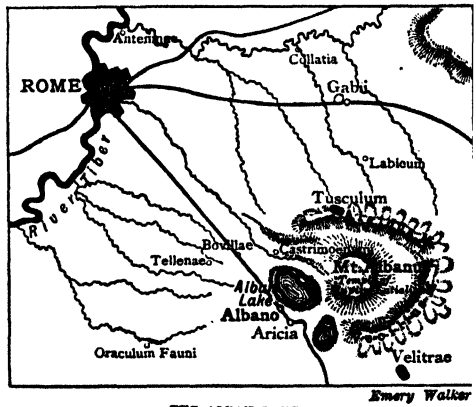
Alba Longa, mod. ALBANO, a very ancient city of Latium, situated 15 miles S.E. of Rome, near the Alban lake and mountain. The Vergilian legend makes Ascanius the founder, and associates the name with the discovery of a white sow; the root of the word, however, is *alb*, "white." Fourteen mythical kings were said to have reigned here. Tullus Hostilius destroyed the city, and removed its inhabitants to Rome, where, according to tradition, they founded several patrician families.

Alban, ST., the first martyr of Britain, lived in the third century. He was converted to Christianity, and suffered as a martyr in 283 or perhaps later. St. Albans (q.v.) is supposed to be either his birthplace or the scene of his death.

Albani, MADAME EMMA, a well-known singer, born 1852, of French Canadian descent, her family name being La Jeunesse. She made her début at Albany, U.S.A., whence, perhaps, she took her professional name. Her first appearance at the Italian Opera, Covent Garden, was in 1872, since which date she has been one of the most popular artistes on the operatic stage. She married, in 1878, Mr. Gye, of the Royal Italian Opera.

Albania, a province of European Turkey, extending along the coast of the Adriatic and Ionian Seas from Montenegro in the N. to Greece in the S., and extending 100 miles inland at its broadest part, and 30 miles at its narrowest. The country is mountainous and thickly wooded, affording plenty of sport. Scutari, on the lake of that name, is the chief town. Dulcigno, a port of some consequence, was ceded to Montenegro under the Berlin Treaty of 1878. The Albanians are commonly regarded as the only surviving descendants of the northern division of the Thraco-Hellenic Aryans, who at the dawn of history are found in exclusive possession of the Balkan Peninsula. They call themselves *Shkipetar*, *i.e.* "Rock" or "Hill Men," a term synonymous with *Albanian*, which itself, through the Byzantine *Arbanitæ*, again reappears in the corrupt form *Arnaut*, their common Turkish designation. The Albanians are the only European Aryans who still largely retain the tribal form of organisation, their three main divisions being—(1) the *Ghegs*, in Upper Albania southwards to river Shkumbi, with chief tribes Mirdites, Pulati, Klementi, and Hotti; (2) the *Toshks* of Central Albania, with chief tribes Liapes, Kheimariots, Khamides, and Suliots; (3) the Hellenised *Epirots*, of the vilayet Yanina, with no tribes. Though somewhat Slavonised about the Montenegro frontier, the Ghegs are the purest representatives of the old West Thracian (Illyrian) stock. They number about 600,000, of whom 400,000 are Mohammedans, 150,000 Roman Catholics of the Latin rite, and 50,000 Orthodox Greeks. The Toshks have been variously affected by Slav, Turk, and Hellenic influences. They number about 800,000, of whom 600,000 are Mohammedans, and 200,000 Orthodox Greek. The Epirots are nearly all Greek, both in religion and language. The Albanian language, which must be regarded as a survival of the old Thraco-Illyrian, is remotely allied to the Greek, and is spoken in two distinct varieties, Gheg and Toshk, differing one from the other as much as High from Low German. The Albanians are physically a fine race, with long head, oval face, rather high cheek bones, long thin nose, small hazel or blue eyes, light brown hair, broad chest, tall shapely figures, except in some of the central districts, where the type has been debased apparently by contact with the Ugrian Bulgarians in the eighth and ninth centuries. The warlike virtues are sedulously cultivated, and for physical courage they are unsurpassed by any people, ancient or modern. The position of Albania was unaffected by Bulgarian events in 1908 and the constitutional changes in Turkey in 1909–10.

Alban Lake, THE, a lake occupying the hollow of an extinct volcanic crater a little to the N.E. of the town of Albano and about 14 miles S.E. of Rome.



Emery Walker

THE ALBAN LAKE.

The lake itself, which is about 7 miles in circumference, and the surrounding country possess great natural beauty. A tunnel cut through the rocks in obedience to an oracle at the time when the

Romans were laying siege to Veii (396 B.C.) keeps the water always at a height of 920 feet above sea-level. Mons Albanus (Monte Cavo) rears itself to the height of 3,000 feet on the E. side of the lake.

Albany, the ancient name for the Highlands of Scotland, and still used as the title of a dukedom. It is the Gaelic form of Albion; the title was first used in 1398, when the brother of Robert III., then the regent of Scotland, was created Duke of Albany.

Albany, LOUISA MARIA CAROLINE, COUNTESS OF, born in 1753, of the family of the reigning princes of Stolberg-Geldern. In 1772 she married Prince Charles Edward Stuart, the Young Pretender. For eight years, owing to disparity of age and tastes, they lived a wretched life, and in 1780 the unhappy wife left her husband. She had before this met in Florence the young poet, Alfieri, and she joined him in Switzerland. In 1803, Alfieri, worn out with unremitting labour, died at the early age of fifty-four. The countess erected to his memory a handsome monument by Canova in the church of Santa Croce, at Florence, where twenty years later (in 1824) she was laid by his side.

Albany, the legislative capital of the State of New York, United States of America, situated on the W. bank of the Hudson river, 142 miles N. of New York city. Originally founded by the Dutch in 1612, it is one of the oldest settlements in the States. The British took possession of it in 1664, and Charles II. granted the colony to the Duke of York and Albany, from whom the chief town derived its name. As a centre of trade with the lakes and the Western States Albany has become wealthy and popular. Large quantities of timber, flour, and other produce are exported, and manufacturing industries have grown up. The Capitol, a fine building in the Renaissance style, is adorned by a fresco, the work of the late William Hunt. There is a city hall in marble with a gilded dome, besides a university, and many public schools.

Albatross, the popular name of Diomedea, a genus of Petrels with ten species (distinguished from the rest of the family by having the hind toe rudimentary, and the tubular nostril one on each side of the upper mandible). They range over the Pacific Ocean and the Southern seas generally, but are most abundant between 30° and 60° S. lat., the home of the common or wandering albatross (*D. exulans*), the largest and strongest of all sea-birds; length of body, about 4 ft.; weight, 15 to 25 lbs.; wing expanse, 12 to 15 ft. When first hatched the albatross is white, the young birds are dusky, and the adults again white, with transverse bands of black or brown on the back, wings darker than the rest of the body, bill yellowish pink. It is often met with at a great distance from land, and, from the numbers seen round the Cape of Good Hope, it is called by sailors the Cape Sheep. It feeds voraciously on fish and small marine animals and any refuse or carrion floating on the waves. When food is abundant, it gorges to such an extent that it is unable to rise, and sits motionless on the waves, but on the approach of danger it disgorges the undigested food, and, so lightened, takes to flight. All the species are very strong on the wing. Towards the end of June albatrosses appear in great numbers in Behring Sea and adjacent waters. The

ALBATROSS.

Kamchadales take them with baited hooks, and use their entrails when inflated as floats for nets, and make various domestic articles and tobacco pipes from the wing-bones. Albatrosses nest on solitary islands like Tristan da Cunha, forming a rough nest of grass and leaves, and laying one white egg, 4 to 5 in. long.

Albay, the capital of the province of the same name in the Island of Luzon, the chief of the Philippine group. The town enjoys a large trade.

Albemarle, ARNOLD VAN KEPPEL, EARL OF, born in Guelderland, 1669, and created a peer by William III., whom he accompanied to England in 1688. In his influence with the king he was a rival to Portland, and served his master with equal courage and fidelity. He was employed about court in various capacities, and, surviving the king, he showed in the war of the Spanish Succession (1702–12) considerable military ability. He died in 1718. [AUMALE.]

Albemarle, DUKE OF. [MONK.]

Albemarle Sound, on the E. coast of N. America, lat. 36° 10′ N. The Roanoke and Nottoway rivers flow into it. The name is also borne by a town in Stanley county, North Carolina.

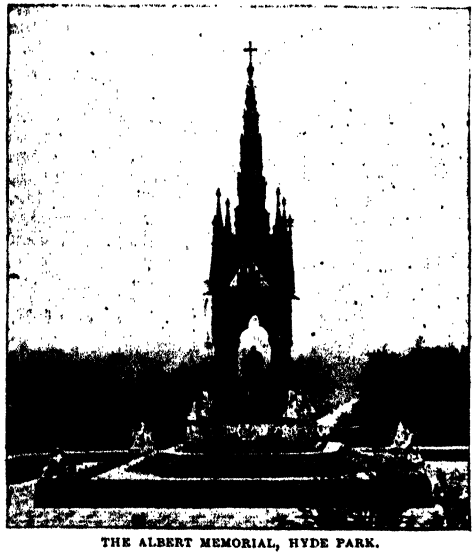
Alberoni, GIULIO, CARDINAL, born in a humble station at Piacenza in 1664. Having entered the Church he went to Rome, and there attached himself to the Duke of Vendôme, who took him to Paris and then to Madrid. At the latter court he was appointed agent for Parma, entered into all the intrigues of the palace, and procured the marriage of Philip V. with Elizabeth of Parma. Under her patronage he rose to be Cardinal, and Prime Minister in 1715. Vigorous, ambitious, unscrupulous, he did his best to restore Spain to her ancient grandeur. In prosecution of this design he seized Sardinia, then in Austrian

hands, supported the Pretender, urged the claims of Philip against the Duke of Orleans as Regent of France, and ultimately provoked the formation of the Quadruple Alliance, which procured his dismissal. Returning to Italy with great wealth he aspired to the Papacy, but spent the last years of his life in his native town, where he died in 1752.

Albert I. (ALBRECHT), Duke of Austria, son of Rudolph of Hapsburg, founder of the famous dynasty, born in 1248. He succeeded his father in 1291 and endeavoured to usurp the Imperial crown, which the electors ultimately conferred on him, after deposing Adolphus of Nassau. However, the Pope never ratified their choice. By his cruelty and greed he provoked his Swiss subjects to revolt and to form a confederation. Whilst endeavouring to crush this movement he was murdered by his nephew John, whom he had deprived of his rights in Suabia.

Albert, Margrave of Brandenburg and first Duke of Prussia, born in 1490 and educated for the Church. Preferring a military life, he marched with the emperor into Italy, and was at the siege of Pavia. He then joined the Teutonic Order and was chosen Grand Master (1511). He came under Luther's influence, adopted the reformed doctrines, and received the duchy of Prussia as a fief from Poland in 1525. He founded the University of Königsberg. He died of the plague in 1568.

Albert, Prince of Saxe-Coburg-Gotha and Consort of Queen Victoria born at Rosenau, near Coburg, in 1819, the second son of Duke Ernest I.



THE ALBERT MEMORIAL, HYDE PARK.

The marriage with the late Queen Victoria took place in 1840, and the subsequent conduct of the Prince fully justified the most favourable anticipations. Studiously keeping out of party politics, and never allowing his personal influence to show itself in affairs of State, he found a wide field for the exercise of his abilities in other spheres. He was a Field-Marshal, and received many other distinctions, occupying the Chairmanship of the Council of the Great Exhibition of 1851. Innumerable projects connected with science, art, education, and charity received his active support. Agriculture especially engaged his attention. When in 1861 his life was suddenly extinguished by an attack of typhoid fever, the outburst of public sympathy with the Queen was unparalleled. In Hyde Park, at Frogmore (where in 1901 Queen Victoria was buried beside him), and in hundreds of towns throughout the kingdom, monuments have been erected to his memory.

Albert Nyanza (the Little Luta Nzige of Speke), a lake in Central Africa between 2° 45′ N. and 2° S. lat., 80 miles W. of Victoria Nyanza. It is 2,720, feet above sea-level, and is about 140 miles long from N. to S., by 40 broad, being bounded on the W. by the Blue Mountains and on the E. by high cliffs. The White Nile, entering it on the W. side, runs from its N. extremity. It was actually discovered in 1864 by Sir Samuel and Lady Baker, though its existence was mentioned by natives to Speke and Grant.

Albertus Magnus, born of noble parents at Lauingen, in Suabia, about 1193. After studying Aristotle at Padua he became a Dominican, and was sent by that Order to Cologne and other cities in Germany as theological lecturer. In 1245 he took his doctor's degree in Paris and taught there for some time. He was made provincial of his Order in 1254, and defended it against the attacks of the University of Paris, controverting also the errors of Averroes. For three years (1260-63) he held the bishopric of Ratisbon. His later years were spent in preaching throughout Bavaria or in retirement, almost his last task being the defence of the orthodoxy of Thomas Aquinas. In his private character he was modest, pious, and upright, though his devotion to astronomy, astrology, and chemistry caused him to be regarded as a magician. His voluminous works show a profound knowledge of Aristotle, whose system he endeavoured to reconcile with the doctrines of the Church. He died in 1280.

Albi, the capital of the department of the Tarn in France, situated 41 miles N.E. of Toulouse. It is a town of great antiquity, giving its name to the Albigenses. An archbishop has his seat there, and the cathedral, a splendid specimen of 13th century Gothic, contains the fine reliquary of St. Clair, the first bishop.

Albigenses, a term popularly given to a sect of Manichæans (q.v.), which sprang up in the south of France at the end of the twelfth century. It was from the town of Albi, where a council was held against them, that their name was derived. The principal heresies of which they were accused were a belief in dualism, the rejection of the Old Testament and the sacraments, and the doctrine that marriage and the use of ritual in Divine service were sinful. The accession of Innocent III. to the

papal throne was the signal for the commencement of the persecution of the Albigenses, which continued with more or less rigour and cruelty until 1229, when a peace was concluded. This "crusade," as it was termed, was characterised by "atrocities remarkable even for a religious war," and the well-known saying of the Legate Arnold, "Slay all, God will know His own!" will serve to indicate the temper of the persecutors. Simon de Montfort, the father of the more celebrated English patriot, was the leader of the crusade, under the Pope's legates, and it was not until after the massacre of thousands of victims, and the devastation of some of the most fertile valleys of southern France, that peace was made. The Inquisition was then at liberty to work its will upon the hapless fanatics, with the result that by the middle of the thirteenth century the Albigenses had ceased to exist.

Albino, an animal in which there is a deficiency or absence of the pigment which is normally present in the skin, iris, and choroid coat of the eye. Thus the skin and hair are white, the iris appears pink from the colour of the blood in it being unobscured by pigment, and a characteristic change may be noted in the choroid on examination with the ophthalmoscope. The white rabbit with pink eyes is a familiar object, and examples of a similar peculiarity are not very uncommon in man. Indeed, "white negroes" were supposed by the early travellers to be a distinct race. The defect, when present, exists from birth. Owing to the deficiency of pigment, the retina is unusually sensitive to light, and this constitutes one of the greatest troubles in albinoism, as seen in the human subject; there is also not infrequently present actual defect of vision.

Albion, the ancient name for England, derived from the Latin *albus*, white, the term having reference to the white cliffs of Dover and the neighbouring coast. It is the same word as Albany (q.v.).

Alboin, one of the most famous of the barbarian kings that assisted in the disintegration of the Roman Empire. He succeeded his father Alduin as chief of the Longobards or Lombards about 553. He completed the defeat of the Gepidæ of Servia and Slavonia, killed Cunimund, their king, and married Rosamund, his daughter. He then pushed on into Italy about 568, and overran the greater part of the northern plains. At Verona in an orgie he produced a cup made out of Cunimund's skull for Rosamund to drink out of. She was so enraged that she induced two of his officers to kill him when asleep, 573.

Albuera, a small village in the province of Badajoz, Spain, the scene of one of the severest engagements of the Peninsular war, in 1811, in which Marshal Beresford gave battle to Marshal Soult, advancing to the relief of Badajoz. The British, by their indomitable courage and sheer strength, drove the French down the slopes with a loss of 9,000 men.

Albumen, a term used in botany as a convenient name for the reserve nutriment in a seed external to the embryo, whether it be within the embryo-sac (endosperm) or outside it (perisperm). If no such store exists in the ripe seed it is *exalbuminous*; but, if present, as in almost all monocotyledons, it may vary considerably in amount or in texture. In the vegetable ivory (*Phytelephas*) it is very hard; in the coffee it is horny; in the poppy, it is oily; and in corn, it is mealy. Though it may contain aleurone (q.v.), its composition is largely non-nitrogenous, and it is in no respect identical with true albumin, deriving its name simply from the analogy of its position and use to the seedling with that of the "white" of an egg to the chick.

Albumin ($C_{72}H_{112}N_{18}SO_{22}$.—Lieberkuhn), the essential constituent of white of egg and blood serum. It is usually prepared from white of egg, where it exists in the form of albuminate of sodium. As thus obtained it forms a yellowish, translucent solid (sp. gr. 1·26), which swells in water, dissolving with difficulty. It is, however, freely soluble in presence of an alkaline salt. The aqueous solution of albumin possesses the characteristic property of *coagulating*, or passing into an insoluble modification, if heated beyond a temperature of 60° C. Albumin exhibits a feeble acid reaction, and combines readily with alkalis to form *albuminates*. It is insoluble in alcohol and ether. Its congulating property is utilised for the clarification of wines, syrups, etc., and also for the fixation of colours in calico printing.

Albuminoids, or *Protein Compounds*, a class of bodies which are particularly associated with the living activity of plants and animals. *Albumin* and *fibrin* in blood; *casein* in milk; *syntonin* in muscle; and *vitellin* in yolk of egg, are important examples of a series of substances which are so similar in their ultimate chemical composition as to suggest (Gerhardt) that they all contain an identical principle, which by its capability of assuming varied forms of aggregation or of associating itself with mineral substances, is able to give rise to many apparently diverse bodies.

Albuminuria, the presence of albumen in the urine. This condition is met with occasionally in healthy individuals as the result of a meal consisting of some highly albuminous substance, such as eggs, but is very common in disease. Blood and pus or matter, when they occur in the urine, necessarily imply the presence of albuminuria, as these substances contain albumen. The conditions then existing are denominated hæmaturia and pyuria respectively. Again, in heart disease, bronchitis, and emphysema (q.v.), and other conditions involving congestion of the kidney, the urine contains albumen. In many of the specific fevers and occasionally in pregnancy the same condition obtains. Lastly, inflammation of the kidney or nephritis, and the various chronic forms of kidney affection which are included in the designation Bright's disease (q.v.), are accompanied by albuminuria. Nephritis is not uncommonly met with after scarlet fever, coming on as a rule, when it does occur, during the third week of that disease, at a period therefore when convalescence

may seem well-nigh established. Moreover, such nephritis is not confined to the severe cases of scarlatina; hence the importance of careful examination of the urine after all attacks of that disease. At the commencement of such albuminuria and in most forms of acute nephritis much can be done for the patient, but if the affection be allowed to develop unrecognised, permanent damage to the kidney results. The presence of albumen in urine is usually recognised by the coagulation which is occasioned on the addition of nitric acid or the application of heat.

Albuquerque, ALFONSO D', the illustrious Portuguese admiral, born near Lisbon in 1453. He served in Africa first, but in 1503 sailed to the East and established a fort at Cochin. In 1506 he took part in another expedition under Tristan da Cunha, captured the rich island of Ormuz in the Persian Gulf, superseded Almeida as Viceroy of the Indies, annexed Goa and subdued Malacca (1508-12). His next feat was to make an unsuccessful attack on Aden, and to enter the Red Sea with the first European fleet that ever penetrated into those waters. After completing the reduction of Ormuz he returned to Goa to find that court intrigues had deprived him of his office. He died at sea broken-hearted (1515), and his body was brought back for burial to Goa, where his tomb is still an object of veneration even to Hindus.

Alcæus, a lyric poet of Lesbos, flourished about 600 B.C. He appears to have actively assisted the nobles of the island in their struggle against the tyrants, and, having been banished, he ended his life in unknown exile. Of his ten books of odes —political, military, religious, and amatory—but a few fragments have come down to us. He wrote in the Æolian dialect, and the fiery vigour of his verses meets with high praise from Horace (*Odo* ii. 13), who adopted several of his measures, notably the Alcaic stanza.

Alcala de Guadaira, a town in Andalusia, Spain, on the river Guadaira, 7 miles E. of Seville, which it supplies with bread.

Alcala de Henares, the Roman Complutum, a town on the river Henares, 17 miles E.N.E. of Madrid, Spain. It was rebuilt by the Moors in 1083, and became in 1510 the seat of a great university founded by Cardinal Ximenes, who was buried in the fine chapel of the College of St. Ildefonso. The *Complutensian Polyglot Bible* was published there, but in 1836 the university was removed to Madrid. The town is now chiefly celebrated for its military academy and powder factory.

Alcala la Real, a town of Spain, 16 miles S.W. of Jaen. Alphonso XI. of Leon captured it in person in 1340. Sebastiani, in command of the French, defeated the Spaniards here in 1810. Some trade is carried on in wine and wool.

Alcalde, the Spanish title for the mayor of a town, a judge, magistrate, or justice of the peace. In the latter sense it is also used in Portugal.

Alcamo, a town in Sicily, 22 miles E. of Trapani in the Gulf of Castellamare. The place contains a castle and some churches and monasteries, and is surrounded by a rich wine-growing country.

Alcantara (Arab. the bridge), a town in the province of Caceres, Spain, situated on the steep bank of the Tagus. It was known as Narbo Cæsarea to the Romans, who built in honour of Trajan, 104 A.D., the superb granite bridge, 670 feet

BRIDGE OF ALCANTARA.

long and 210 feet high, that spans the river. This noble structure was partially destroyed by the English in 1800, and again in the Carlist War of 1836. The Spaniards, too supine to restore it, now use a ferry. *The Knights of Alcantara*, an Order founded for resistance to the Moors in 1156, derived their name from the defence of the town in 1213. For nearly six centuries they maintained their position as a religious body, but since 1833 have existed only in a civil capacity.

Alcestis, the daughter of Pelias and Anaxitia, married Admetus (q.v.). She died for her husband, but was brought back from Hades by Heracles. Her story furnished a theme to Euripides, and in later times to Robert Browning, who dealt with it in *Balaustion's Adventure.*

Alchemy (Arab. *al-kimia*, a hybrid combination of Arab. *al*, the; and Greek, *chemeia* = *chumeia*, a mingling; O. French, *alquemie*), the pretended science which aimed at the transmutation of metals by means of the philosopher's stone, at the production of an *elixir vitæ* or panacea for bodily ills, and at the discovery of an *alkahest* or universal solvent. As these results were in the main to be attained by a knowledge of the intimate constitution of substances, alchemy laid the foundation of modern chemistry. It was in Alexandria towards the beginning of the third century that the theories of Greek metaphysicians, the mystic precepts of the Kabbala and of Eastern enthusiasts, and the supernatural claims of various religions became fused into a vague yet distinct system, the author of

which was reputed to be Hermes Trismegistus, a fabulous Egyptian king. The professors of this secret art adopted from the first an experimental as opposed to a rationalistic method of dealing with nature, and undoubtedly stumbled upon some valuable discoveries, such as sulphuric and hydrochloric acids, oxygen gas, and certain properties of mercury. Many centuries, however, elapsed before the scientific fruits of their labours could be garnered. Zosimus, Alexander of Aphrodisia, Nemesius, the pseudo-Diogenes, and pseudo-Plato are the chief names of this new school, which linked itself on to astrology by associating the planets with the metals, and borrowed from speculative ontology the idea of four elements and four humours. From Alexandria the germs of transcendental physics were imported into Arabia and carried by the Arabs into Spain. Gebir, Avicenna, Rhazes, and Mohammed-ben-Zakaria, flourishing with many others from the eighth to the tenth centuries, spread "the science of the key" amongst European speculators, and added several new items, such as *aquafortis*, sal ammoniac, distillation, and the cupellation of metals to the alchemists' repertory. About the middle of the twelfth century the dream of commanding the inmost secrets of nature had taken a strong hold on the imagination of Europe, and the search for gold, hitherto a subordinate part of the alchemistic scheme, became a wide-spread curse. Side by side with Albertus Magnus, Roger Bacon, Thomas Aquinas, Raymond Lully, Basil Valentine, Bernard of Trèves (all of whom see), and other honourable investigators, there sprang up a host of impostors and lunatics actuated by greed for untold wealth, or more often by the prospect of duping rich patrons. Like our King John and Philip the Fair of France, Pope John XXII. and Alphonso X. of Leon and Castile dabbled in the art. But the fear of an excessive production of the precious metals, the supposed recourse to unhallowed practices, and the heretical tendencies of many adepts led everywhere to severe restrictive measures. In England, for example, a statute was in force against seekers after the philosopher's stone from 1404 to 1689. Persecution brought about the formation of secret societies, such as the Rosicrucians, and induced those engaged in such pursuits to wrap up their statements in a jargon still more unintelligible, if possible, than that used by their predecessors. Paracelsus (1493–1541, q.v.) the mad genius, stands on the border line between visions of the past and the progressive insight of the present. Without making any very definite scientific advance, he hit by intuition on certain principles that have since been verified, and he drew inquirers from the base and useless pursuit of gold into the more worthy ambition to relieve human suffering. He thus became the father of Van Helmont and of Stahl, and perhaps, we might also say, of Boyle and Bernard Palissy, whilst Francis Bacon may be classed as one of his family though not by direct descent. From them the torch of true knowledge was handed down to Priestley, Lavoisier and Scheele, and so on to the great chemical masters of the 18th and the 19th centuries. As a matter of fact, we have inherited little from the alchemists save their terminology, which still meets us at every turn in such words as alcohol, alkali, amalgam, arsenic, potash, laudanum, crucible, matter, affinity, precipitate, and distillation.

Alcibiades, the brilliant but erratic and unprincipled Athenian soldier and statesman, was born about 450 B.C. His father, Cleinias, claimed to be the descendant of Ajax, and his mother sprang from the family of the Alcmæonidæ. Having lost his father at the battle of Coronea, he was educated by his kinsman, Pericles; but his wealth and personal beauty, combined with the influence of the Sophists, aggravated the natural defects of his character. At Potidæa, Delium, and elsewhere, he gave proof of dauntless courage. Socrates, however, whose life he saved in the latter of these actions, failed to exercise any permanent control over his habits. His success in the national games, his lavish expenditure on public services, and his skill in dealing with his fellow men, won for him immense popularity. His first act as a politician was to bring about an alliance between Athens, Argos, and Mantinea (420 B.C.). His next venture was the disastrous Sicilian expedition, of which he was appointed joint commander with Nicias and Lamachus. From this he was early recalled (415 B.C.), to answer a charge of being concerned in that mysterious offence, "the mutilation of the Hermæ." Rather than face his accusers he escaped to Sparta, betrayed the plans of the Athenians, helped to organise the force which Gylippus led into Sicily, and planned the invasion of Attica. He then went over to Asia Minor, and induced many Athenian colonies to revolt. The Spartans, mistrusting him, decreed his death, upon which he sought refuge with Tissaphernes, and induced the Athenians to believe that he could command the aid of the satrap in their struggle against the Lacedæmonians. Peisander negotiated his return, and he joined the force under Thrasybulus, off Samos, as a general. Several victories were gained, and he came back to Athens in triumph (407 B.C.). He soon after failed at Andros and Notium, lost his prestige, and had to fly to the Thracian Chersonnese. When Sparta, at the battle of Ægospotami, gained the supremacy of Greece, he found shelter at the court of Pharnabazus, in Phrygia, and was there slain (404 B.C.) in a raid upon his house, the reason for which has never been made clear.

Alcira, an ancient walled town built on an island in the river Xucar, in the province of Valencia, Spain. It was named Algesira by the Arabs. Silk, rice, and oranges are the chief products.

Alcmæon, the legendary son of Amphiaraus and Eriphyle, who killed his mother because she betrayed her husband into the fatal expedition against Thebes. Pursued by the Furies, he obtained purification at the hands of Phegeus of Arcadia, and married Alphesibœa, his preserver's daughter. He abandoned her for Callirrhoe, daughter of Achelous; but his first wife's brethren punished his fickleness with death, being themselves killed subsequently by Callirrhoe's sons.—This personage

must not be confounded with Alcmæon, the descendant of Nestor, and founder of the family of the Alcmæonidæ at Athens; nor with Alcmæon, the Pythagorean philosopher of Crotona (500 B.C.), who was the first dissector of animals for scientific purposes.

Alcman, a very early Greek poet, born at Sardis, in Lydia, about 670 B.C. He became a citizen of Sparta, and composed in the Doric dialect six books of lyrical pieces.

Alcohol, $C_2H_6O(C_2H_5OH)$, or *Ethylic Alcohol*, the spirituous principle of wines and beers. It occurs in nature as a result of the fermentation of saccharine liquids. An aqueous solution of alcohol is obtained by the distillation of such liquids which have undergone the process of fermentation, and it may be rendered stronger by repeated distillations; but the last 9 per cent. of water cannot in this way be removed, except by the aid of some such dehydrating agent as chloride of calcium or carbonate of potassium. Pure alcohol or *Absolute Alcohol* is a colourless, refractive, mobile liquid which is soluble in water in all proportions. It has never been frozen, and is therefore of great value in very cold countries in thermometers, where it takes the place of mercury. *Eau de Cologne* (q.v.) is made by flavouring alcohol with a kind of oil. B.P. 78° C., S. G. = ·79. All spirituous liquors contain alcohol, and it is this that forms the intoxicating element in brandy, whisky, etc. The estimation of the quantity of alcohol present in spirituous liquors is termed *Alcoholometry*, and is an important operation in connection with the revenue. The term *Alcohol* is now applied to any one of a series of substances containing carbon, hydrogen, and oxygen, and similar in their constitutional type to common alcohol. [Ex., *Methul Alcohol* or *Wood Spirit*, CH_3OH; *Glycerol*, $C_3H_5(OH)_3$, etc.] The most recent divisions (see Luff and Candy, 1910) of alcohols are according to the number of alcoholic hydroxyl groups in the molecule of the alcohol—e.g.:

Monovalent, or *monohydric*, alcohols. *Divalent*, or *dihydric*, alcohols. *Trivalent*, or *trihydric*, alcohols. *Polyhydric* alcohols, and so on.

The *polyhydric* alcohols have become of late years of great theoretical importance in consequence of their close connection with *glucose* (q.v.), *lævulose*, and other sugars, the most interesting being *mannite* ($C_6H_8(OH)_6$), a *hexhydric* alcohol.

Alcoholism. As the result of the abuse of stimulants certain affections are met with, particularly cirrhosis of the liver (q.v.), gout (q.v.), and nervous disorders. Habitual drinkers suffer from digestive troubles, from nausea and sickness; the eyes may be watery, eruptions may appear on the nose and face, the limbs and tongue are tremulous; sleeplessness, vacillation of character, and loss of memory occur. In such persons an attack of *delirium tremens* may develop. Delirium and muscular tremor are pronounced symptoms in this affection. The temperature is raised, the pulse quickened, the tongue covered with a creamy fur, the skin usually very moist; there is complete loss of appetite, and sleeplessness is a most distressing symptom. The form the delirium takes is not uncharacteristic; it is accompanied by hallucinations, *i.e.* the patient smells smells, hears noises, sees objects of various kinds, sparks, vermin crawling about his bed, and the like. He talks much, is full of suspicions, imagines that policemen are searching for him, or that he is tormented by evil spirits. In the early stage of the affection he can be recalled to himself, but between this condition and absolute mania every gradation may occur. The disease usually terminates favourably at the end of four or five days, the patient falling into a refreshing sleep, but only as a rule for him to recur to his drinking habits, with a resulting relapse of delirium tremens which may at length prove fatal. The treatment of alcoholism is rather a question of moral influence than of drugs; in actual delirium tremens, however, much can be done for the patient. Many remedies have had their advocates from time to time, of which digitalis and narcotics have enjoyed most favour. The indications for treatment are, however, difficult to understand, and the condition is, of course, one which eminently calls for skilled treatment.

Alcott, Louisa May, an American writer, born at Germantown, Pennsylvania, in 1833, her father having been a well-known author on educational subjects. Miss Alcott devoted herself to literature from an early age, and in 1855 published some *Fairy Tales*. During the War of Secession she busied herself with nursing the wounded, and later on wrote her *Hospital Sketches*. Most of her works, such as *Little Women*, *Little Men*, and *Good Wives*, are addressed to the young. Of all her sketches, *An Old-fashioned Girl* is, perhaps, the best known in this country. She died in 1888.

Alcove, a term of Spanish origin, signifying a portion of a chamber shut off from the rest by a curtain or balustrade, usually containing a bed or seats.

Alcoy, a town in the province of Valencia, Spain, situated on a river of the same name, about 24 miles N. of the city of Valencia. The manufacture of fine cloth, paper, soap, and cigarettes thrives here, and there is a considerable trade in wheat, silk, and oil.

Alcudia, a fortified port in the island of Majorca, opposite to Minorca.—Several towns in Spain bear the name also, and one of these—Alcudia de Carlet, in Valencia—was the duchy of Godoy, "Prince of Peace" (q.v.).

Alcuin, or Alcuinus Flaccus Albinus, born at York about 753 A.D., and educated by Bede obtained a high reputation for learning. Appointed Abbot of Canterbury in 782, he received an invitation from Charlemagne to undertake the intellectual regeneration of his empire. Alcuin accordingly became attached to the imperial court at Aix-la-Chapelle. He established schools, libraries, and other educational institutions, besides lecturing in person at Paris and elsewhere. His knowledge

appears to have been wide and various, embracing Latin, Greek, Hebrew, and all the theological and philosophical learning of his day. Among other rich benefices conferred on him was the Abbey of St. Martin at Tours, where he died in 804.

Alcyonaria, or OCTOCORALLA, that division of the Anthozoa (q.v.) characterised by the possession of fringed tentacles and by having the MESENTERIES or SEPTA arranged in multiples of eight. An account of the structure of a typical member of this order is given under ALCYONIUM. The Alcyonaria are always colonial, though simple ones have been described. The principal families are the ALCYONIDÆ, TUBIPORIDÆ, AXIFERA, and PENNATULIDÆ, including the "dead men's fingers," the organ-pipe corals, the gorgonias, and the "red coral" (Corallium).

Alcyonella, one of the best known of the few genera of fresh-water BRYOZOA, belonging to the order Phylactolæma.

Alcyonidium, a common British genus of CTENOSTOMATA, a division of BRYOZOA. It is sometimes popularly known as Pipe Weed or Pudding Weed.

Alcyonium digitatum, the commonest of the British ALCYONARIA, affording a very instructive example of the general structure of that group. It lives just below the low tide line, attached

ALCYONIUM DIGITATUM.

A, With the polypes extruded; B, A single polype fully extruded; C, A polype in the act of protruding itself; D, Spicules.

to stones and shells, and growing as greyish or reddish masses, from the lobed or digitate shape of which it has acquired the popular name of "dead men's fingers." These masses, which may attain a height of ten inches, are really colonies, and, when living, one of the individual "polypes" may be seen rising from each of the white starlike spots studded over the surface. Each polype is crowned by a circle of eight fringed tentacles, in the centre of which is the mouth, leading to a digestive chamber (stomodæum). This is open below to the body cavity, and is held in place by eight membranes known as mesenteries. The only skeletal structure present is a series of bony spicules scattered through the tissues.

Aldborough, or ALDEBURGH, a market town in Suffolk, situated on the river Alde, close to the sea, and 95 miles distant from London by the Great Eastern Railway. It possesses some coasting trade, and many of its inhabitants are engaged in fishing. The place is much resorted to in summer for seabathing. The poet Crabbe was born here in 1754. Pop. (1901), 2,405.

Aldebaran, a fixed star of the first magnitude, in the constellation Taurus. It is found by drawing a line to the right through the belt of Orion.

Aldehyde, $C_2H_4O(= CH_3CHO)$, a product of the oxidation of ordinary alcohol, may be obtained by distilling alcohol in a retort with bichromate of potassium. It forms a colourless, volatile liquid which is readily miscible with water, and is an excellent solvent for such substances as iodine, sulphur, and phosphorus. B.P. 21° C. S.G. ·78. Easily oxidised, even by atmospheric exposure, to acetic acid. As in the case of alcohol, the term Aldehyde is now used, in a general sense, to signify any substance which is derived from a primary alcohol by the removal of two atoms of hydrogen from the molecule.

Alder, the English name of the small genus *Alnus*, shrubs or trees belonging, with the birches, to the order *Betulaceæ*, native to the North Temperate and Arctic zones and to the Andes into Chili. They are characterised by the scales

LEAF OF ALDER (*Alnus glutinosa*).

of the female catkin becoming woody, so as to form a permanent fir-cone-like structure. Our one British species, *A. glutinosa*, has roundish, short-stalked leaves, with wedge-shaped base and slightly-toothed margin, hairy and glutinous when young, dark green and glossy when older. It may reach seventy feet in height and nine in girth, but seldom exceeds forty in height, and is commonly treated as coppice. It grows well by water, its roots binding together the banks. The bark of the

shoots (which are generally somewhat triangular in section, as is also their pith) is used in tanning and dyeing leather red, brown, yellow, or, with copperas, black. The wood is durable under water, and is said by Virgil to have been the first wood used by man for boats. It was used for piles at Ravenna and for the Rialto at Venice, and is still so employed in Holland. It is also used for herring-barrels, for sabots and turnery generally, and, of late, for paper-making; but its chief use is for gunpowder-charcoal. For this purpose shoots five or six years old, or about four inches across, are employed.

Alderman, the name given by the Saxons to the "comes," or count, who under the Franks had entrusted to him the government of the shire. Aldermen are in most corporations the chief officers after the mayor, and take precedence of the town councillors or burgesses, from whom the aldermen are usually chosen. Their duties and privileges considerably varied in different boroughs before the passing of the Municipal Corporation Act, 1835. The number of councillors in each borough varies from twelve to forty-eight. One fourth of the municipal council consists of aldermen and three-fourths of councillors. The Corporation of London was not included in the Municipal Corporation Act, and the old system remains there in full force. In Scotland there is no such title, the officers of corresponding rank being termed "bailies." The term alderman has recently acquired a particular significance. By the Local Government Act, 1888, county aldermen hold a very important position in carrying out the administrative business of each county. [COUNTY COUNCILS.]

Alderney (Fr. *Aurigny;* Lat. *Riduna*), one of the Channel Islands, a dependency of Guernsey, attached to Great Britain since the Conquest, and separated from Cape La Hague by the dangerous Race of Alderney, 7 miles broad. Beyond it lie the Caskets, small outliers of the group. The island is not more than 3 or 4 miles in length, by about 2 miles in breadth. The coast is rocky, but the central parts abound in excellent pastures, and the breed of cows is famous. The internal government is conducted by a judge and six *jurats*, assisted by twelve *douzeniers*. The town of Alderney contains a 12th century church. The island is fortified; but the construction of a breakwater with a view to the establishment of a naval station has been abandoned. Pop. (1901), 2,062.

Aldershot, town and camp, Hants, 34 miles from London on the London and South-Western and South-Eastern Railways. The spot was selected by Lord Hardinge as suitable for a camp where practical instruction in field manœuvres could be given to the officers and men of the three arms of our service. The country is open, undulating, and healthy, covered here and there with fir woods, and intersected by the Basingstoke Canal; strategically the position is of value as affording protection to the Metropolis. The suggestion was not carried out until 1855, and the first occupants of the new lines were two battalions of the Guards and seven of embodied militia. On the return of the army from the Crimea, a considerable force of cavalry, artillery, and infantry took up quarters here. Permanent barracks have now taken the place of the wooden huts existent before 1881. A new camp was formed on the outskirts of Woolmer Forest (1905–7), apart from which the main buildings and drill grounds occupy a space 2½ miles long by nearly a mile in length. The permanent buildings can house 20,000 men and 4,000 horses. It is the chief command of the kingdom and the forces stationed there are always expected to be efficient and ready for taking the field at any moment. Reviews and sham-fights are of constant occurrence during the spring and summer. Pop. (1901), 30,974.

Aldhelm, an English bishop and saint of the 7th century; he became a monk, and ultimately Abbot of Malmesbury, and devoted his wealth to the Church. He is said to have built the first organ in England. He died in 709.

Aldine Editions, editions chiefly of the Classics, which emanated from the press of Aldus Manutius, a celebrated printer who lived in Venice in the sixteenth century. These editions, which all bore his device of an anchor and dolphin entwined, were of singular beauty, and as remarkable for the correctness of the texts as for clearness of the printing. Aldus was the first to make printing a fine art, and his editions have become a proverb for excellence and beauty. An English printer, named Pickering, issued similar editions of the Classics, remarkable for their beauty, which were known as the English Aldines.

IMPRINT OF ALDINE EDITIONS.

Aldred, or EALRED, a monk of Winchester, who rose to be Abbot of Tavistock, and Bishop of Worcester, with which office he desired to combine in 1060 the Archbishopric of York, but the Pope objected. Aldred, accompanied by Tosti, Earl of Northumberland, visited Rome, and on undertaking to resign Worcester received his pall. On the death of Edward the Confessor he transferred his allegiance to Harold, and, when Harold was slain, at once attached himself to William, whom he crowned at Westminster. Soon after the capture of York by William (1069), he died of weariness and disappointment at the failure of his hopes.

Aldrich, HENRY, D.D., a scholar of Westminster, and ultimately a canon and dean of Christchurch, Oxford, born in 1647. He built Peckwater Quadrangle at Christchurch, All Saints' Church, and Trinity Chapel, Oxford. His most serious work was the famous treatise on Logic, and he composed several anthems. He died in 1710.

Aldrovandi, the name of a gifted family of Bologna. ULYSSE, born 1522, died 1607, was a distinguished professor of natural history. He formed with great zeal and industry a vast collection, and began a treatise on a colossal scale. His work was completed after his death. GIUSEPPE, a decorative painter of high repute, flourished

towards the end of the 18th century. TOMMASO, son of the last, painted the council chamber at Genoa, and died in 1736. POMPEO AGOSTINO, a cousin and contemporary, was a well-known engraver and oil-painter in Rome, where he died in 1739.

Ale, a well-known intoxicating liquor, made by infusing malt in hot water, fermenting the liquid, and adding a bitter, usually hops. [BREWING.] *Porter* has a greater proportion of roasted malt; *beer* is usually used of weak ale, and is a more general term. In some districts, however, it is beer which is the strong, and ale the weak liquor.

Alectoromorphæ, a group of Birds in Huxley's classification made to include the families—Turnicidæ (Hemipodes), Phasianidæ (Fowls and Fowl-like Birds), Pteroclidæ (Sand Grouse), Megapodiidæ (Mound Birds), and the Cracidæ (Curassows), these corresponding to the order Gallinæ or Rasores (without the pigeons and Tinamous). In 1868 the group was restricted, and divided into Alectoropodes (containing the Phasianidæ), and Peristeropodes (the Mound Birds and Curassows).

Aleman, LOUIS, born at Bugey, 1390. In 1422, being then Archbishop of Arles, he was sent by Pope Martin V. to Sienna to negotiate the removal thither of the Council of Pavia. For this service he received the cardinal's hat, and in 1431 stoutly opposed the claim to papal supremacy put forward by Eugenius IV. For this, and for his share in the election of the Anti-pope Felix V., he was excommunicated. However, he persuaded Felix to resign, and was restored to his dignities by Nicolas V., who sent him as legate into Germany. He died in 1452, and was canonised in 1527.

Alemanni, a confederacy of German tribes which existed in the third century, and was a source of much annoyance to Rome. Clovis finally broke up their power in 496. The name still exists in the French name for the Germans, *Allemands.*

Alembert. [D'ALEMBERT.]

Alembic, an apparatus for distillation which was much in vogue in the earlier days of chemistry. It consists of a *retort* with a movable head of peculiar shape attached to a *receiver.*

Alemtejo, a province of Portugal, with an area of 9,416 square miles. It is well-watered, and diversified with hill and dale. Its chief town is Evora.

Alençon, the capital of the department of the Orne, France, situated on the north bank of the river Sarthe, 105 miles from Paris. The Gothic cathedral of Notre Dame dates from the sixteenth century. Linen, straw hats, hosiery, etc., are made here, but the most famous manufacture is the *point d'Alençon,* though few lacemakers are now to be found in the place.

Alençon. The counts and dukes who derived their title from the town are too numerous for separate description. FRANCOIS, Duc d'Alençon, and later Duc d'Anjou, brother of Charles IX., Francis II., and Henry III., the most remarkable possessor of the title, was born in 1554. He professed sympathy with the Huguenots, probably because he was a suitor for the hand of Elizabeth of England, but he took part nevertheless in the siege of La Rochelle. In 1581 he visited England, and very nearly ensnared the affections of the virgin Queen. Another object of his ambition was the crown of the Netherlands. He assisted the Confederate States in their revolt against the Duke of Parma, but his schemes became too apparent to the sturdy Netherlanders, and he was forced to return to France, where he died in 1584 of premature decay.

Aleppo or HALEB, the capital of the Turkish vilayet of the same name in Northern Syria, is situated on the river Koeïk about seventy miles from the Port of Scanderoon on the Mediterranean. Known to the ancients as Berœa, Aleppo from very early times has been the chief emporium of the caravan trade with India, Persia, and Armenia. It is now a station on the Indo-European telegraph line and consuls of most of the Powers reside there. It may possibly become in the future the starting point of a railway to India. The city is well built of white stone, and is surrounded by a strong wall. A newly-erected citadel also protects it. The chief manufacture is cloth, but silk, cotton, shawls, and gold and silver thread are amongst its industries.

Aleppo Boil, Aleppo Bouton, a disease in which boils are developed on the face or extremities which run a very chronic course, and ultimately leave, in the majority of cases, very obvious scars. The affection is met with in India, Asia Minor, and other parts of the East.

Alesia, now ALISE, Côte d'Or, France, was in Roman times a strong city, the capital of the Mandubii, who called it *Urbium Mater.* Vercingetorix was besieged here in 52 B.C. The town was utterly destroyed by the Normans A.D. 864.

Alessandria, a province and city of Italy, formerly part of Piedmont. The province embraces more than 1,900 square miles, with a population of about 811,000. The soil is fertile, producing cereals, flax, and fruits. The silkworm also is largely cultivated. The town, situated on the Tanaro river, 45 miles S.E. of Turin, was founded by the Lombards in 1168, and presently changed its first name Cæsarea to that which it now bears in honour of Pope Alexander III. It is the seat of a bishopric, contains a cathedral, and is strongly fortified. The battlefield of Marengo is two miles distant.

Aleurone, a substance present in many seeds, in the cotyledons, or in the endosperm, either as minute granules, as in the pea, or, in the case of oily seeds, in larger roundish or angular bodies. They are similar in composition to protoplasm, and are sometimes termed "protein-grains," their function being apparently that of a reserve supply of nitrogenous food for the embryo. They sometimes contain a crystalloid, and almost invariably a globoid, or globular mass of a double phosphate of calcium and magnesium, soluble in acetic acid.

Aleutian, THE, or ALEUTAN ISLANDS (Russ. *Aleut,* rock), a chain of islets stretching over the

North Pacific Ocean from Kamptchatka to Alaska. Their number exceeds 150, Behring's Island, Copper Island, Attoo, Oonimak, and Oonalashka being the most important. The two former still belong to Russia, but all the others were ceded to the United States with Alaska in 1867. The soil is volcanic, and eruptions still occur in some of the group. The inhabitants subsist mainly by fishing, and export quantities of skins. It has been conjectured that the first colonists of the New World may have found their way from Asia by means of these stepping stones. The group is sometimes known as the Catherine Archipelago, from having been explored in 1760 by the order of Catherine II. of Russia.

Alewife (*Clupea mattawocca*), the Gaspereau of the French Canadians, an important food-fish of the herring family, common on the Atlantic shore of North America, where it ascends into fresh water in early spring to spawn. Large quantities are taken in small-meshed seine nets, salted, and exported to the West Indies.

Alexander the Great, King of Macedon, was born at Pella 356 B.C., being the son of Philip II. and Olympias. He was educated partly by Lysimachus, partly by Aristotle, and succeeded to the throne in his twentieth year. Some of the subject states were then in revolt. He at once reduced Thrace and Thebes, thus overawing the others. He was now free to concentrate his forces against Darius Codomanus, King of Persia, and in 334 crossed the Hellespont with 30,000 foot, and 5,000 horse. His first great victory was at the Granicus river, near Mount Ida, and Sardis, Ephesus, Miletus, with nearly all the important cities in Asia Minor, fell into his hands. He suffered from a severe fever in Cilicia and was warned that his physician, Philip, was bribed to poison him, but he showed the letter to Philip, followed his advice, and recovered. Next year he met the army of Darius, 500,000 strong, on the Issus river, and won an overwhelming victory, capturing the Persian sovereign, whom he treated with great magnanimity. Syria and Phœnicia were now overrun; Damascus was occupied; Tyre and Gaza were reduced to ashes, and Alexander entered Jerusalem. Thence he passed into Egypt, which was easily subdued, and the foundation of Alexandria left his name stamped for ever on the country. There is a story that he visited the Oracle of Jupiter Ammon in Libya, and was declared by the priest to be a son of that deity. From Egypt Alexander returned to Phœnicia, crossed the Euphrates and Tigris, and met Darius on the plain of Arbela, where he finally crushed the power of Persia. Babylon, Susa, and Persepolis fell into his hands with all their vast treasures (331). Having reduced Persia, he now directed his steps towards the north, and in 329 B.C. overthrew the Scythians on the banks of the Jaxartes, and penetrated into India, crossing the Indus near Attock. On the banks of the Hydaspes river (Behut) he defeated a native prince called Porus, but afterwards treated him as a friend and ally. Marching on to the Acesines (Chenâb), he crossed the barren plain between that river and the Hydraotes (Ravee), and there overcame a second Porus, all of whose territory he handed over to the first conquered prince. The Hyphasis (Sutlej?) formed the limit of his progress, for his soldiers refused to proceed farther. He returned by way of the Indus, which he descended in boats, and by the Persian Gulf to Babylon. About a year was now spent, partly in re-organising his vast empire, which had suffered through his prolonged absence, partly in planning new conquests, partly in the dissipations to which he was too prone. In 323, just as he was about setting forth on an expedition to the West, a fever seized him at the close of a banquet, and in a few days he died. His body was enclosed in a gold sarcophagus and preserved at Alexandria. Of his four wives Roxana alone bore him issue—a posthumous son, who was murdered in his childhood by Cassander. He designated no successor, and his dominions were divided amongst his generals, between whom long and bloody wars ensued. Alexander's character offers strange moral and intellectual contrasts. As a soldier Hannibal and Napoleon are his only compeers, and in actual achievements he surpassed them both. Many passages in his life testify to a lofty generosity and a spontaneous benevolence worthy of the best days of chivalry, yet he ordered the murder of his faithful lieutenant Parmenio and killed his friend Clytus with his own hand. His love of learning and his taste for art were undoubtedly genuine, and he could practise the sternest self-denial, yet he cut short his career by shameless intoxication. No one was keener to detect and despise the servile flattery of his court, but this did not prevent his accepting divine honours and even insisting on them. Deservedly, perhaps, the more sublime features of his strangely-blended nature have taken the strongest hold of the imagination of mankind, and Alexander stands forth as the greatest hero of the ancient world.

Alexander Nevskoi, a saint of the Greek Church, who in life was a grand-duke of Russia. He defeated a combination of the Danes, Swedes, and Teutonic knights in a great battle on the banks of the Neva, and from this fact he got his name. He died in 1263, and a fine monastery with a noble church in St. Petersburg, the works respectively of Peter the Great and the Empress Catherine, mark the site of his victory and enshrine the bones of the canonised warrior.

Alexander I., PAULOVITCH, Czar of Russia, was born in 1777, and educated by his grandmother, Catherine II., one of his instructors being La Harpe, a Swiss republican. He married Louisa Maria of Baden, but separated from her. After the assassination of his father, the weak-minded Paul, he was next in succession, and was probably a party to the murder which opened his way to the throne in 1801. The young sovereign began his career with many enlightened reforms, encouraging education, abolishing torture and other judicial abuses, and liberating the press. At the same time he adhered to the hereditary policy of national aggrandisement. He procured the cession of Georgia, and then joined the coalition of England, Austria, and Sweden against France. The Battle of Austerlitz (1805)

broke up this alliance, and Alexander, after briefly dallying with Prussia during the Jena campaign, came to terms with Napoleon at Tilsit, receiving a strip of German territory as his reward. Pursuing the same policy he adopted the "continental system," attacked Sweden for importing British goods, and annexed Finland to Russia. In 1809 the treaty of Vienna brought the Czar a fresh accession of territory in the shape of Eastern Galicia, which Austria had to yield. The encouragement given by France to Polish malcontents severed the friendship that had lasted five years, and in March, 1812, Alexander declared war. Then followed the terrible Russian campaign, and, whatever sentiments may have been previously inspired by the Czar's ambition and treachery, his stubborn courage and resolution certainly broke Napoleon's record of triumph. During the final years of the great European struggle Russia was loyal to the allied Powers, and when the Congress of Vienna rearranged the map of Europe, the Grand Duchy of Warsaw fell to Alexander's share. He was also the moving spirit in the Holy Alliance, a confederacy to suppress European reforms. Troubles in Poland, religious melancholy, and dread of revolution darkened the rest of his reign. He died in 1825 of an intermittent fever contracted in a visit to the Crimea, leaving the crown to his brother Nicholas.

Alexander II., NICOLAEVITCH, Czar of Russia, son of Nicholas, and nephew of Alexander I., was born in 1818. He displayed in early life a fondness for the arts of peace rather than for those of war, and his inclinations seemed to turn towards conciliatory reforms and intellectual progress. Coming to the throne in 1855, just at the crisis of the Crimean War, he was constrained at first to adopt the military policy that Nicholas bequeathed to him. A few months later the course of events made the conclusion of peace inevitable. He then began to devote his energies to internal improvements; railways were constructed with foreign capital throughout Russia; the navy was strengthened, and the mercantile marine considerably developed; arts and manufactures of every kind met with encouragement; and, most important of all, in 1861 23,000,000 serfs were emancipated, whilst four years later elective councils were established in all the provinces. Even towards Poland some degree of liberal sympathy was extended, though the revolutionary outbreak in 1861 was put down with great severity. A spirit of anarchy had now begun to show itself in certain sections of Russian society, spreading from the native aristocracy through the students and the literary classes, and ending with the poor in the large towns. The Czar started a reactionary system, and rather aggravated than crushed the evil. In 1866 Karakozoff, a student and a Nihilist, fired at the sovereign, and almost every day revealed new plots and fresh ramifications of conspiracy. But these internal troubles did not check the progress of Imperial aggrandisement. Under Kaufmann, Lomakine, Skobelef, and other able generals, Turkestan, Bokhara, Samarcand and Khiva were successively conquered and all Central Asia was brought under Russian influence. The reduction of the Caucasus was completed, and the trans-Caucasian provinces were subjected to thorough organisation. In 1871 Gortschakoff, at the Conference of London, caused the clauses excluding Russian fleets from the Black Sea to be struck out of the Treaty of 1856. Turkey was invaded in 1877, and a war restored to Russia the portion of Ressarabia which she had ceded to Moldavia in 1856. Nihilism, however, pervaded the country. In 1881, whilst driving in the streets of his capital, the Czar was killed by a bomb thrown by a Nihilist, Grenevitsky, who perished also in the explosion. He was succeeded by his son Alexander III., who died in 1894.

Alexander II., King of Scotland, born in 1198, succeeded his father, William the Lion, in 1214. He espoused the cause of the Barons against King John, who invaded the border counties. Alexander retaliated and ultimately joined Louis of France in his expedition against the king. For that he was excommunicated, but after John's death he made peace with the Pope and also with Henry III., marrying his sister Joan. In 1234 disputes as to the claim of homage from Scotland, and as to the ownership of the three border counties, estranged the two sovereigns, but these differences were arranged. Another rupture took place in 1244, owing to the punishment by Alexander of one Bissett for supposed complicity in the murder of the Earl of Athol. Hostilities, however, were avoided in this case also. Alexander had many difficulties with his Scotch subjects, and in 1249 was engaged in an attempt to reduce the lord of Argyll, when he died.

Alexander III., son of the preceding, born in 1241, was but eight years old at the time of his father's death. At the age of ten he was wedded to Margaret, daughter of Henry III., and some years of his minority were spent in struggles between the Scotch and English factions for control of the royal pair. In 1263 Haco of Norway invaded Scotland, and was severely defeated by Alexander at Largs, and ultimately all the islands were ceded by the Norsemen, except Orkney and Shetland. Alexander, whose wise and just rule brought his country to high prosperity, was killed in 1286 by a fall from his horse, leaving only a granddaughter "The Maiden of Norway" to succeed him. After him no Alexander sat on the Scottish throne.

Alexander III., the successor of Adrian IV. as Pope in 1159. The Emperor Frederick I. set up a rival, but, supported by England, France, and the Roman clergy, Alexander held his own and excommunicated the Emperor, who had at last to give way. Alexander took the part of Thomas A' Becket against Henry II., and canonised him after his death. He died in 1181.

Alexander VI., RODRIGO LENZUOLI, but better known by his mother's name of Borgia, born in 1431. Originally an advocate and then a soldier, he was advanced to high position in the Church by his uncle, Calixtus III. His habits were most dissolute, but by intrigue and bribery he

secured his election to the Papacy in 1492. By his alliance with the Sultan Bajazet II. he drew upon himself the invasion of Rome by Charles VIII. of France, and was forced to ally himself with that monarch, who then proceeded to the conquest of Naples. Alexander now brought about a combination of the Emperor Maximilian, Ferdinand of Spain, the Republic of Venice, and the Duke of Milan, and Charles was speedily driven out of Italy. To gain wealth and compass political ends even the dagger and poison were freely used, according to some accounts, at the Papal Court; and though the crimes of the Borgias may be exaggerated, there can be no question that the family was markedly unscrupulous in an age when much was tolerated. The cruel fate of Savonarola (q.v.) silenced the priesthood; the fear of assassination and the hope of a share in the plunder kept the laity quiet, whilst for some years rapacity and licence ran riot at Rome. At last, in 1503, Alexander is said to have drunk some poisoned wine prepared by him for a victim.

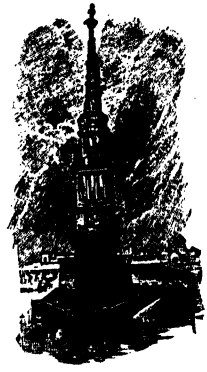
Alexander, SEVERUS. [SEVERUS.]

Alexander, THE RIGHT REVEREND MICHAEL SOLOMON, D.D., of Jewish origin, born in Posen 1799, became a rabbi, but was converted to Christianity, took a curacy in Ireland, and was in 1832 appointed professor of Hebrew in King's College, London. When in 1841 the King of Prussia proposed to join the English Government in appointing a Protestant bishop at Jerusalem, Dr. Alexander was selected. He died suddenly in 1845.

Alexander, WILLIAM, Earl of Stirling, was knighted by James I., who granted to him Nova Scotia for the purpose of colonisation. Later on Charles I. offered the dignity of knight-baronet in Scotland to any person who helped the colony by contributions. Ultimately Alexander sold his grant to France. In 1626 he was made Secretary of State for Scotland, and in 1631 Judge in the Court of Session. His original peerage dated from 1630. He aspired to poetry and wrote "Aurora," as well as some tragedies, and possibly the translation of the Psalms ascribed to James I. He died in 1640, and a century later the peerage lapsed.

Alexandra, THE QUEEN MOTHER. Widow of Edward VII. (d. 1910) and mother of the present King, George V. Born Dec. 1st, 1844, at Copenhagen, married March 10, 1863, Queen 1901–10. Daughter of the late Christian IX. of Denmark.

Alexandria, the former capital of Egypt, was founded by Alexander the Great on the coast of the Mediterranean not far from Lake Mareotis, and at a distance of 118 miles from Cairo. At the death of the conqueror Egypt fell to the share of Ptolemæus Soter, an enlightened ruler, who collected the splendid library, now unhappily destroyed, and built the famous Pharos. His successors prided themselves on making the city a centre of literature and science, as well as of commerce, and when in 48 B.C. it fell into Roman hands there was no perceptible diminution of its lustre. Christianity made one of its first homes there; and the mixture of Greek philosophy with Eastern mysticism that occupied the Alexandrian schools proved a soil fertile in doctrines and heresies to trouble the early Church. Between theological and political contentions the city suffered severely in the later years of the Empire, till in 640 A.D. it was seized by Amru, Omar's lieutenant, who burnt the library and destroyed everything perishable that bore witness to ancient greatness. Two centuries later the Turks became masters of Egypt. The final ruin of Alexandria was completed by the discovery of the Cape route to the East at the end of the fifteenth century. In the Napoleonic era the French and English fought a severe battle close to its walls (1801), and in 1807 the English occupied the place for a few months. Mehemet Ali and his dynasty were established in Egypt by a Convention held there in 1841. A few years later the adoption of the overland route to India restored some degree of prosperity to the port, and in 1851 a railway to Cairo was constructed. A new town sprang up, built in European style, and a new harbour was opened—both to the east of the ancient city. Steamers and trading vessels of all nations frequented the place, which rapidly increased in wealth and population. In 1869 the completion of the Suez Canal injured irreparably the commerce of Alexandria, and the bombardment of the forts by the British in 1882 reduced many buildings to ruins. Few monuments of antiquity remain. The chief of these are the Pillar of Diocletian, known as Pompey's Pillar, which stands to the west of the city, and one of the obelisks called Cleopatra's Needles, the other having been removed to London.



THE ANCIENT PHAROS OF ALEXANDRIA.

Alexandria, the name of a county and its capital in Virginia, U.S.A. The town is on the west bank of the Potomac, seven miles south of Washington. It has a good harbour, accessible to vessels of the largest size, and does a large trade in corn, flour, and tobacco. The Chesapeake and Ohio Canal begins here.

Alexandrian Codex, a manuscript of the Greek Bible, written with uncial (capital) letters on parchment, now in the British Museum. It was presented to Charles I. in 1628 by the patriarch of Constantinople.

Alexandrian Library, the most famous of all the libraries of the ancient world, is said to have numbered 700,000 volumes at the most flourishing period of its existence. It was founded by Ptolemy of Egypt (283 B.C.), was burned during the siege of the city by Cæsar, and again fired by the bigoted Christians in 391 A.D. It was in 641, however, that it was finally destroyed at the taking of Alexandria by the Arabs, under Amru. The

volumes of paper and parchment were distributed as fuel, and were said to have lasted for six months.

Alexandrian Philosophers, the name given to that school of philosophers who were desirous of reconciling and modifying the several pagan faiths in order to raise a barrier against the doctrine of Christianity. [NEO-PLATONISTS.]

Alexandrine, a kind of verse much used in French tragic poetry, consisting of twelve syllables. The last line of Pope's well-known couplet in the *Essay on Criticism* furnishes an excellent example:—

A needless Alexandrine ends the song,
Which, like a wounded snake, drags its slow length along.

Alexandropol, a town in the province of Erivan, in Georgia, trans-Caucasian Russia. It is situated 5,077 feet above the sea level.

Alexinatz, a circle or administrative department in the kingdom of Servia. It has an area of 829 square miles. The chief town bears the same name. The district produces large crops of tobacco.

Alexipharmics, antidotes to snake-poison (from the Greek *alĕxō*, I ward off, *pharmakŏn*, a drug), a large number of plants, the value of which has not yet been scientifically tested. They are often called Snake-roots, and include many species of the genus *Aristolochia*.

Alexius I., a Greek emperor, who was born in A.D. 1048, the nephew of Isaac Comnenus. He distinguished himself in early life as a soldier, and served the reigning Emperor Nicephorus with fidelity. In 1081 the jealousies of the imperial ministers, and his own popularity with the army, led him to revolt against his sovereign, whom he deposed, ascending the throne of Constantinople himself. During the troublous period of the First Crusade, when the Turks were pressing forward to the Hellespont, and the barbarian invaders threatened the northern and western frontiers of the empire, he displayed much skill and courage. His severity and avarice, however, wore out the affections of all classes, and he was suspected of treachery by his Latin allies. He died in 1118, and was succeeded by his son John. A favourable sketch of his life and character was written by Anna Comnena, his favourite daughter.

Alfalfa, now commonly abbreviated in commerce into Alfa, the popular name of a grass which furnishes one of the most important of paper materials, also commonly called Esparto or Spanish grass. It is *Macrochloa* (formerly *Stipa*) *tenacissima* and not, as often stated, *Lygeum spartum*. Introduced by Mr. Thomas Routledge in 1856, it came into general use during the American war, when the cotton famine produced a scarcity of rags, just when the repeal of the paper duty had increased the demand. It is a native of the south of Spain and the north of Africa, growing in dry ferruginous soil near the sea. It reaches three or four feet in height, and its leaves yield 56 per cent. of their weight of fibre. The demand exceeds the supply; but the costliness of Alfa is tending to the increased use of wood-pulp as a substitute.

Al-Farabi, an early and distinguished Arabian philosopher, who flourished in the beginning of the tenth century. Like most of the speculative thinkers of his race, he was a physician, and practised his art at the court of Seif-Eddaula, in Damascus. From the fragments of his works that have come down to us, he appears to have had a tendency towards asceticism, derived from contact with the Neo-Platonic school. Al-Farabi died in 950 A.D.

Alfieri, COUNT VICTOR, a distinguished Italian poet, born at Asti, in Piedmont, in 1749. His family was noble and wealthy; but the loss of his father early in life left young Alfieri without control or guidance, and he spent his youth in restless wanderings and not very creditable adventures. He had as a boy revealed certain poetic tastes, which were suppressed for many years; but after his return to Turin, in 1772, he wrote a successful tragedy, *Cleopatra*, which was put upon the stage in 1775. In 1777 he met at Florence the wife of the Young Pretender [ALBANY], and at once conceived for her a violent affection. They met again in Rome three years later, when the countess had left her husband. Alfieri wrote in Switzerland four tragedies; and in 1787 went to Paris, for the purpose of superintending the publication of his collected dramas by Didot. At this period he composed his two principal prose works, *Del Principe et Delle Lettere* and *Della Tiranide*. Alfieri, though a revolutionary at heart, was disgusted by the excesses of the popular party in Paris, and after the taking of the Bastille he crossed over with the countess to England. They returned in 1791; but next year, on the imprisonment of Louis XVI., made their way out of France with some difficulty, and finally settled in Florence. Alfieri then wrote an apology for the French king and a satirical poem, *Misogallo*, inspired by intense hatred for the Republican Government. Henceforward his life was devoted to eager study, only interrupted for a short time by the French occupation of Italy. He abandoned the muse of tragedy for that of comedy, and produced six plays before the end of 1802, some of them being political satires. He died on October 8, 1803. His tomb in Santa Croce lies between those of Michael Angelo and Machiavelli. Though his literary efforts were somewhat marred by want of education and by possession of comparative wealth, Alfieri cannot be denied the praise of having revolutionised the Italian drama by bringing to bear on it the best influences of the Greek, the English, and the French stage.

Alfonso, the name of a great many kings of the Asturias, Leon and Castile, of Aragon, of Naples, and of Portugal, the most remarkable amongst whom were:—ALFONSO III., "the Great," who ascended the throne of the Asturias in 866, and fought with valour and success against the Moors, adding Leon and other provinces to his kingdom. Towards the end of his reign he had to contend against many insurrections, and was defeated by his son Garcias, to whom he resigned the crown in 908. He died two years later. The famous Church of St. James of Compostella was consecrated in his reign, and

he is said to have compiled a portion of the Chronicles of the Kings of Spain.—ALFONSO VI., "the Valiant," King of Galicia, Leon, and Castile, 1066. He wrested from the Mohammedans a large part of Spain, including the city of Toledo, which he made his capital. A fresh invasion, however, of the Almoravides, in 1086, wrecked his hopes. He died in 1109. Roderigo Diaz de Bivar, renowned as the Cid, flourished in his reign.—ALFONSO III. or IX., "the Noble," succeeded to the kingdom of Castile, but not of Leon, in 1158. He married Eleanor, daughter of Henry II. of England. Having sustained a severe defeat from the Moors at Alanos, in 1195, he allied himself with the sovereigns of Aragon and Navarre, and completely crushed his enemies at Las Navas de Tolosa, 1212. The celebrated university, afterwards transferred to Salamanca, was founded by him at Palencia. He died in 1214.

Alfonso I., son of Henry, Count of Portugal, and Teresa of Leon and Castile. Born 1094. On coming of age, having defeated his mother and Alfonso VIII. of Castile, he made Portugal independent. In 1139 he gained an overwhelming victory over the Moors at Ourique and was proclaimed king. Endeavouring to annex Spanish territory he was taken prisoner in 1167, and forced to cede all he had conquered. He died at Coimbra in 1185. Tradition asserts that he was a man of enormous stature.

Alfonso X., "The Wise," of Leon and Castile, came to the throne in 1252. He was invited to contest the imperial crown against Rudolph of Hapsburg, and, whilst thus engaged, he was driven from his own kingdom by a Moorish invasion and by the insurrection of his son, Sancho, 1282. Failing to recover his position, he died of chagrin at Seville in 1284. He was a learned prince, and to him Spain owes the code known as the Siete Partidas. He also caused the Alphonsine Tables to be drawn up for the use of astronomers.

Alfonso XIII., KING OF SPAIN, posthumous son (*b.* May 17, 1886) of Alfonso XII. and Maria Christina. The Queen acted as regent until 1902, when Alfonso personally took up the reins of government. He married (May 31st, 1906) Princess Victoria Eugenie, daughter of the late Prince Henry of Battenberg and Princess Beatrice, daughter of the late Queen Victoria. An attempt to assassinate the royal couple was made on their wedding day. The heir to the throne is Prince Alfonso (born May 10, 1907). Prince Jaime was born June 23, 1908, and Princess Beatrice June 22, 1909. The King has paid several visits to England and was present at the funeral of King Edward VII. (May, 1910). He takes a great interest in aviation.

Alford, HENRY, D.D., Dean of Canterbury, a divine and poet, born in 1810. He took a scholarship at Trinity College, Cambridge in 1827, and a fellowship at Trinity in 1834. In 1841 and 1842 he was Hulsean lecturer at Cambridge, and his discourses were published shortly afterwards. In 1853 he accepted the incumbency of the Quebec chapel. In 1857 Lord Palmerston appointed him to the deanery of Canterbury, where he spent his remaining years. The first volume of his *Greek Testament* came out in 1849 and the last in 1861. *The Queen's English*, *The Year of Praise*, *Letters from Abroad*, and *A Commentary on the Old Testament* are amongst the most serious of his later productions. His poetic works include *School of Heart* (1835), *Abbot of Muchelvaye*, etc. (1841), *Odyssey* (in blank verse), and *The Children and the Lord's Prayer*. He died in 1871.

Alfred or ÆLFRED, THE GREAT, the youngest son of Ethelwulf, King of Wessex. He went to Rome, it is said, as a child, and was not only blessed but anointed by Pope Leo IV. He served his brother Ethelred gallantly in the field against the Danes, winning at Ashdown in Berkshire the battle which is yet commemorated by the White Horse. When Ethelred died in 871, he succeeded to the throne. For a few years there was a respite from invasion, but in 874 Guthrum appeared again in the North, and settled down in East Anglia, preparing for a new onslaught. In 876 a Danish fleet attacked Wareham, and ultimately seized Exeter. They were hemmed in by Alfred and surrendered in 877. Next winter, however, reinforced by fresh hordes, they set out from Chippenham, and, other forces co-operating from east and south, completely surrounded Alfred and compelled him to take refuge in the Island of Athelney among the Somerset marshes. It is to this period of exile that the story of the burnt cakes belongs. In the course of a few months the king had gathered a large enough force, and early in the summer he fell upon the Danish camp at Eddington near Westbury, inflicting such a loss as to compel Guthrum to conclude the Peace of Wedmore. Ten years of tranquillity followed. Alfred codified the laws of Egbert, Offa, and Ini, tempering them with notions of justice derived from the Mosaic Scriptures and the Gospel. He established many schools, the chief being at Shaftesbury, Athelney, and perhaps Oxford. Men of learning and piety were invited from France and entrusted with educational posts. He himself took in hand the translation into the popular tongue of the *De Consolatione* of Boethius, *The History of the World* by Orosius, Gregory's *Pastoral*, and Bede's *History of the Church*, and he introduced into these works not a few sensible comments and expositions of his own. His works may be regarded as laying the foundation of English prose literature. In 892 war interrupted these peaceful pursuits. Whilst a large Danish fleet attacked the Kentish coast at Lympne, Hastings made a dash at the Thames. Ethelred, Alderman of Mercia, routed the invaders at Benfleet and drove them up the valleys of the Thames and Severn into Wales, whilst Alfred defeated another force at Exeter. In the following year Hastings again appeared on the Lea, but Alfred drained off the water, left his ships high and dry, and forced him to retire from the kingdom. Four quiet years ensued, but Alfred's health gave way, and he died in 901 at the age of fifty-three. His millenary was celebrated in 1901.

Algæ, a class of plants of which the best-known are the seaweeds, though there are fresh-water representatives of almost every subdivision of the class. Like ferns, mosses, and fungi they do not produce true flowers or seeds, and are, therefore, termed Cryptogamia (q.v.); but, like fungi and unlike ferns and mosses, they present no true distinction of stem or axis and leaf or lateral appendage, the whole of their structure being cellular, *i.e.* without any vessels. Algæ and fungi are, therefore, united as the sub-kingdom Thallophyta (q.v.). Many of the larger Algæ have cylindric stem-like stalks, structures called "rhizoids," resembling roots, and flattened leaf-like fronds; but these fronds are commonly terminal, not lateral, and there is no distinction in internal structure, whilst the rhizoids are mere organs of attachment, not of food-absorption Though entirely cellular, some Algæ have a thickened epidermal or pseudo-cortical layer externally, and the kelp-weed group (*Laminarieæ*) have a zone of tissue (*meristem*) in which growth by cell-division occurs, thus increasing their diameter much as do some of the higher plants. The Algæ differ from Fungi in containing the green colouring-matter chlorophyll (q.v.), common to so many groups of plants. To take this as a fundamental distinction seems objectionable, as being a physiological rather than a structural character, and accordingly in 1874 Sachs endeavoured to substitute four structural grades, *Protophyta*, *Zygosporeæ*, *Oosporeæ* and *Carposporeæ* (each including both algal and fungal forms) based upon the methods of reproduction; but the older division is now adopted as more natural. The class Algæ may thus be briefly defined as thallophytic cryptogams containing chlorophyll. Living almost exclusively in water, either salt, brackish, or fresh, or in damp places, Algæ have also been termed *Hydrophyta*. In structure they present every grade, from a single cell to a filament of elongated cells end to end (monosiphonous), several parallel filaments (polysiphonous), or the large pseudo-stems and leafy fronds already mentioned. Reproduction is effected by simple cell-division; by the formation of free-swimming ciliated bodies called "zoospores," or of motionless structures produced four together in a fructification or "sporangium" and hence termed "tetraspores;" or by sexual "oospheres" or egg-cells, fertilised by motile ciliated "antherozoids." Some Algæ secrete much carbonate of lime, the Corallines being entirely covered with it, and the microscopic Diatomaceæ form silicious skeletons with geometrical markings of great beauty. The chlorophyll is frequently accompanied by other colouring matters, the blue phycocyan, the brown phycophæin and the red phycoerythrin, and these afford an obvious distinction between four sub-classes which have also structural characters. These are the unicellular *Cyanophyceæ*, or blue-green Algæ, including Chroococcaceæ, Nostocaceæ, Oscillatorieæ and Scytonemeæ; the *Chlorophyceæ*, or green Algæ, mostly in fresh or shallow water, the resting cells of which often turn red, as in the Red Snow plant, their chlorophyll being reduced to chlororufin, including Siphoneæ, Volvocineæ (the "globe animalcules"), Protococcaceæ, Confervoideæ, Conjugatæ, Desmidiaceæ and Diatomaceæ; the

ALGÆ.

1. Some diatoms · 2. Protococcus; 3. Spirogyra; 4. Fucus; 5. Conceptacle of same; 6. Oogonium; 7. Antheridial branch; 8. Oosphere with antherozoids; 9. Sargassum.

Phæophyceæ, *Melanophyceæ*, or olive-brown seaweeds, all marine, mostly between tide-marks, including the kelp-weeds, Laminarieæ, and the bladder-wracks, *Fucaceæ;* and the *Rhodophyceæ*, *Florideæ*, or red Algæ, mostly from deeper water, including the Corallines. Of these groups the chief will be described under separate headings.

Algarotti, Count Francesco, an eminent Italian writer on science and art, born at Venice in 1712. He studied at Bologna and Florence with much distinction, and then spent some time in the best literary society in Paris. His first work (1733) *Newtonianismo per le Donne*, in which he popularised the new philosophy, proved a complete success. After a careful inspection of the galleries of Italy he wrote *Saggio sopru la Pittura*, a critical treatise which met with high approval. He also published essays in verse on many scientific and literary subjects. He died at Pisa in 1764.

Algarve has a population of 255,191. It is the most southerly province of Portugal, bounded by the Atlantic to the S. and W., Spain to the E., and Alemtejo to the N. The province, which has a length of 85 miles and an average breadth of 20 miles, with an area of 1,937 square miles, is hilly, but rich valleys abound, and yield an excellent crop of olives, grapes, figs, oranges, and almonds, whilst on the coast there are valuable fisheries of sardines and herrings. The chief towns are Faró and Lagos.

Algebra, in its extended sense, is the science of numbers treated symbolically. Letters were first

used to indicate the quantities (by Vieta, 16th century), but shortly thereafter symbols were substituted, and later still the numbers, to avoid duplication of symbols—*e.g.* x^2 instead of $x\,x$. The laws of arithmetic apply to algebra. But in arithmetic the only unit employed is +1, whereas in algebra it is found necessary to introduce others. Thus Descartes introduced the negative unit −1, which *is* defined as the quantity that when added to the positive unit gives us zero, and which when multiplied by itself gives us +1. Since his time the use of another unit $\sqrt{-1}$ has been found necessary. [EQUATIONS.] This is defined as the quantity that gives us −1 when multiplied by itself. [IMAGINARY QUANTITIES.] In the science of quaternions (q.v.) other units are introduced, with, however, perfectly defined characteristics. Besides these units it is necessary to have a code of invariable laws that shall govern all operations performed with them. Thus in arithmetic we have $2 \times 3 \times 4 = 3 \times 4 \times 2$, that is, any product of any multiples of the unit 1 is the same, whatever order we take to perform the multiplication. So in algebra we have $abc = bca = cab$. The three chief laws are (*a*) the commutative law. Additions and subtractions, or multiplications and divisions, may be made in any order. (*b*) The distributive law. The multiplication of a sum of terms is the sum of the multiplications of each term; so also with division of a sum of terms. (*c*) The law of indices. The product of two powers of a number is that number raised to the sum of the powers. [MATHEMATICS.]

For "graphs," see GRAPHIC MATHEMATICS.

Algeciras (Arab. *The Island*), a Spanish seaport, situated 6 miles from Gibraltar on the opposite side of the bay. It derives its name from the islet that closes in one side of the harbour. The town was built by the Moors, and captured by Alfonso XI. in 1344. Admiral Saumarez defeated the combined Spanish and French fleets here in 1801. The town was the seat of the Conference in 1906 of the particularly interested European Powers, the U.S.A., and Morocco, for the settlement of disputed matters in Moorish administration.

Algeria (Fr., *L'Algérie*; Sp., *Argel*), a North African colony of France, between Morocco on the west and Tunis and Tripoli on the east: it extends from the Mediterranean on the north side to an ill-defined limit on the south side. The colony has been organised in two great divisions, called respectively northern and southern Algeria. The total area under control (1910) is about 343,500 square miles, with a Mediterranean coast-line of 650 miles. It is divided into (1) *Tell* (Arab. *Tal*), a mountainous region with broad valleys or plains, cultivated and settled; (2) *Sersous* or steppes, with brackish "shotts" or lakes without outlet; and (3) still farther from the sea, the *Sahara*, or oasis-dotted desert. The highest point of the Aures, an offshoot of the Atlas (q.v.), is Shelliah, 7,611 feet. The government and administration of Algeria are centralised at Algiers, under the authority of the Governor-General, who represents the Government of the Republic throughout Algerian territory. With the exception of the non-Mussulman services of Justice, Public Instruction, Worship, and the Treasury, he controls all administration. The Budget of Algeria is distinct from that of France. For 1910 the estimates gave the expenditure as £5,555,616 and the Revenue £5,555,835. The chief towns are Algiers (q.v.), Oran (106,000 inhabitants), Constantine (58,000), Bône (43,000), Tlemcen (40,000), Blida (33,000), Mascara (23,000), Mostaganem (22,000), and Setif (22,000). The principal rivers are the Shelif, Summan, Harrash, Isser, Seybouse, Wad-el-Kebir, Mazafran, and Rummel; none navigable, and the smaller ones almost dry in summer or lost in the sands before they can force a way for themselves from the steppe in which they rise to the Mediterranean, into which most of them fall.

The total *population* in 1906 was 5,231,850, including the military establishment, and 5,158,051 without it. Of the inclusive total 729,960 were Europeans, 4,501,890 Natives. The Mohammedans numbered 4,418,063, in 1906, and included Kabyles or Berbers—the true aborigines largely mixed with the *débris* of the Roman and Vandal colonists, mostly mountaineers, and the Arabs or nomad descendants of the invader who drove the Berbers into the mountains. There are also some negroes, whose forefathers arrived as slaves, but the Turks and their progeny by native mothers ("Koolooghis") are not now recognised as a class distinct from the town Arabs or "Moors." The Jews, who have absorbed a large share of the trade and financial business, were in Algeria at an early date, though most of them are sprung from those driven out of Spain and Portugal.

The *climate* is hot in summer and mild in winter. Frost and snow are almost unknown, except on the high plateaux, and on the loftiest parts of the Tell, where the cold is severe, and the snow, which lies on the loftiest summits until June, often deep. Rain, wind, and cold usually come from the N.W. The N.E. blasts are rare and innocuous, and the mistral, by the time it reaches Algiers, is robbed of its virulence. The sirocco is in winter only a warm desert breeze, but in summer it is a fiery blast. The average rainfall is about 36 inches, and the rainy days in the year 80. June, July, August, and September are almost rainless, and the last two extremely warm. October and November are summer-like months, with occasional heavy rains. April and May form the most delightful period of the year, and from December to March the weather is like that of a fine bright autumn. At Algiers the thermometer ranges between 112° in August to 32° in January, the mean of 13 years being from 78° in August to 54° in January.

The *Fauna* of the eastern portion resembles that of Sicily and Sardinia; that of the west is more like Spain. The lion, panther, serval, hyæna, jackal, golden fox, and genet are still common. Mouflons and gazelles are frequent, and the Barbary monkey is troublesome in places. The Barbary deer is found in the forest of Beni Saleh, and near Ghardimaou. Camels, horses, and sheep are numerous; goats and cattle pasture in the uplands. The ornithology and ichthyology resemble

those of Southern Europe, but of the fresh-water fish five are peculiar to Algeria. Tortoises, chameleons, scorpions, and lizards abound, but of the snakes the horned viper of the Sahara and plateaux is the only venemous species. Invasions of locusts (q.v.) and crickets are frequent and destructive.

The *Flora* number about 3,000 species. Most European grains, fruits, and vegetables can be grown. The fig and orange are staples, the date is the harvest of the oases. Vines and tobacco are extensively cultivated. Alfa and esparto grass are with corn, cereals, early fruits, and fibres extensively exported, especially from the high plateaux; while the forests yield pine, cork, oak, pistachio, carub, myrtle, olive, mastic, etc. In general the flora is that of Southern Europe, and like it is in greatest perfection in spring. During the hot months it dries up, but roses, violets, and geraniums bloom all through the winter.

The *mineral* wealth includes beautiful marbles, iron, salt, onyx, lead, copper, calamine, cinnabar, and there are numerous hot springs, some of which, like the Hammam Meskoutin, attract the numerous invalids who pass the winter in Algeria.

After being successively under the Romans (A.D. 20), Vandals (429), and Arabs (647), with periods during which the Spaniards and the Sultan of Morocco held portions, most of Algeria fell under Turkish control (1520), when Algiers became a nest of pirates until 1830, when it was seized by the French, who after hostilities and revolts lasting till 1881 established their rule throughout the entire country. The *commercial* status of the colony is progressive. In 1909, 309,695 acres of vines yielded 181,031,820 gallons of wine; the mining output in 1907 was valued at 21,634,043 francs, and the olive oil trade produced 12,098,200 gallons from 12,802,170 trees, whilst the fisheries realised £153,250, and the forest revenue £240,000. In 1909, 4,947,256 tons of merchandise were cleared at Algerian ports.

Algiers (Fr. *Alger;* Arab. *Al Gezair*, The Isles), the capital of the province of that name and of the whole French colony of Algeria, is situated on the Mediterranean, being built in the form of an amphitheatre on the slope of a mountain facing the sea, from which the tiers of white houses offer a bright and striking picture. Founded by the Arabs about A.D. 935, perhaps on the site of the ancient Icosium, Algiers under its Deys was for nine centuries a nest of pirates, who preyed with impartiality on the vessels of all nations trading with the Mediterranean. Many attempts were made to suppress this abomination. The Spaniards held the place from 1510 to 1516. Charles V., Louis XIV., Cromwell, by the vigorous hand of Blake, all essayed with incomplete success this difficult task. In 1816 an English fleet, under Lord Exmouth, bombarded the town, and put an end to the enslavement of Christians, but not to the insolent misdeeds of the corsairs. In 1830, to avenge an alleged breach of international courtesy, Charles X. of France sent an expedition which captured the place, and the subjugation of the whole country was slowly effected. Under the French Algiers has greatly improved. The upper town and the suburb of Mustapha contain several handsome streets, such as the Boulevard de la République, and fine squares, chief of which is the Place du Gouvernement. An Archbishopric has been established, and there are law courts of every grade, a university, a museum, schools, theatres, and all the other adjuncts of French civilisation. The harbour will now accommodate 300 merchant vessels and 30 ships of war. The fortifications have been immensely strengthened. Of late years Algiers with its suburbs has become a favourite winter resort for invalids. It is also one of the principal French torpedo stations. A railway connects Algiers with Tunis and Constantine on the one side and Oran on the other. Pop. (1906), 138,240 (municipal), and 154,059 (communal).

Algoa Bay, an inlet on the S.E. coast of Africa, about 425 miles E. of the Cape of Good Hope, and having a breadth of nearly 20 miles. The first British emigrants to Cape Colony landed here in 1820, and Port Elizabeth, now the chief town of the district, was founded in the S.W. angle.

Algol, a remarkable double-star in the constellation Perseus. Its brightness varies regularly every two or three days. The light is constant for the greater portion of this period. It then begins to decrease, and has a minimum brightness for about twenty minutes. This Professor Vogel attributes to the star and its companion being at a greater distance from the sun. Algol returns to its original distance from the sun and maximum luminosity in ten hours after the variation commenced. In the 10th century it was distinctly red, but it is now white.

Algonquins, one of the great divisions of the North American Indians, originally occupying nearly the whole region from the Churchill and Hudson Bay southwards to North Carolina, and stretching from the eastern slopes of the Rocky Mountains to Newfoundland. The term Algonquin is purely conventional in the sense now used by ethnologists. It is a contraction of *Algomequin, i.e.* "People of the other side," in contradistinction to the Iroquois, who held the south side of the Upper St. Lawrence, and who formed an important enclave within the Algonquin domain. The grouping is linguistic, that is, it comprises all those numerous tribes who speak varieties of a now extinct stock language, of which there appear to be five distinct branches: 1. *Powhattan*, spoken by all the Virginian tribes (Powhattans, Panticoes, Pamunkies, Rappahannocks, Accomacs, and others); 2, *Abenaki*, spoken by all the New York, New England, New Brunswick, Nova Scotian, Cape Breton, and Newfoundland tribes (Abenakis, Mikmaks, Bothuks, Etchemins, Penobscots, Passamaquoddies, Mohicans, Winnepesaukies, Narragansets, Pequods, Adirondaks, Manhattans, Sankikani, etc.); 3, *Nipercinean*, spoken by all the Labrador, Laurentian, and Hudson Bay tribes (Montagnais, Nasquapi, Mistassini, Tadousacs, Chippeways or Ojibways, Ottowas, Mississaugies, Musconongs, and Kristeneaux or Krees); 4, *Lennape*, spoken by the Lenni-Lennape or

Delaware tribes; 5, *Illinois*, spoken with great dialectic diversity by all the western tribes (Shawnees, Kikkapoos, Illinois, Miamis, Pottawattamies, Kaskasias, Mitchigamies, Peorias, Sacs, Foxes, Cheyennes, Arapahoes, Blackfeet). The Algonquins, and especially the western group, are typical redskins, tall, of coppery complexion, with long, lank black hair, aquiline nose, high cheek bones, massive jaws, and dolichocephalic head. Nearly all are now either extinct or removed to government reserves, the Blackfeet, some of the Krees and Montagnais, and one or two others alone still occupying part of their original territories.

decorative art. The two finest halls in the palace are the *Court of the Ambassadors* and the *Court of the Lions*, the last of which was admirably reproduced at the Crystal Palace, Sydenham. The *Hall of the Abencerrages* is the reputed scene of the massacre of that family (A.D. 1484). An earthquake in 1821, and a fire in 1890, did much damage to the structure.

Ali (Arab. *The sublime*), the cousin of Mahomet, who gave him his daughter Fatima in marriage. On the death of the prophet, Abu-Bekr, Omar, and Othmar all claimed and obtained precedence,

EXTERIOR VIEW OF THE ALHAMBRA.

Alhama (Arab. *The Bath*), a town in Granada, Spain, of some importance in Moorish times, and possessing hot mineral waters, whence its Arabic name. Another Alhama exists in the province of Murcia, Spain, and is also known for its sulphur springs, and there is a third in Aragon.

Alhambra (Arab. *The Red Castle*, with reference to the bricks of which it is built), the famous palace and stronghold of the Moorish kings of Granada, in Spain, was founded by Mahommed II. about 1273 A.D., but the gorgeous arabesques that decorate the interior are ascribed to Yusuf I., who died in 1345. Ferdinand of Aragon captured the castle in 1492. The buildings occupy the crest of a hill that overlooks the city of Granada and commands a glorious view. On a neighbouring height stands the Generalife, which was the summer residence of the Moorish kings. The Alhambra has been carefully preserved as the most noble monument in existence of Moorish architecture and

and Ali founded the sect of *Shiahs* as opposed to the Sunnites, the stricter followers of Mahomet. In 656 A.D. he was proclaimed Caliph in spite of the opposition of the Ommiades, who supported Amru. He was murdered by a Karigite fanatic at Kufa in 661, and the Shiahs yearly commemorate his death, to the wrath of the Sunnites. His descendants under the name of Fatimites established themselves as rulers of Egypt and N. Africa at the end of the twelfth century.

Ali Pasha. 1741–1822. *See* ARSLAN.

Alias, in law, a second name. When a party sues or is sued (generally the latter) by two names, he is described as A—— B—— *alias* C—— D——. Some fine-drawn arguments were once extant as to the possibility of a man having a second name. But in modern times, with the facilities of wisely amending in judicial proceedings, the name of the individual is less important,

In an indictment for murder the name of the deceased is obviously of the very highest importance.

Alibi, a defence resorted to where the party accused, in order to prove that he could not have committed the crime with which he is charged, offers evidence that he was in a different place at the time the offence was committed. This defence is not limited to criminal trials. In Scotland it is necessary for the prisoner to give the Crown special notice of such a defence, stating where the prisoner was at the time of the commission of the crime.

Alicante, a province and town in the S.E. of Spain. The province was formed in 1834 from parts of Valentia and Murcia. It is 73 miles long by 68 broad, and has an area of 2,090 square miles. The northern districts are mountainous and barren, but the plains to the south bear heavy crops of wheat, maize, barley, flax, sugar, and every kind of fruit. Esparto grass is one of the largest and most valuable exports. The chief industries are spinning and weaving in silk, wool, flax, and cotton, lace-making, oil-crushing, and the distillation of spirits. The town and port of Alicante is one of the busiest commercial centres of Spain, ranking only after Cadiz and Barcelona. It is connected with Madrid, 282 miles distant, by railway. The harbour lies at some distance from the town and is protected by heavy batteries. A strong castle looks down upon it from a height of 400 ft. Alicante was occupied by the Moors from 715 to 1258 A.D.

Alice Maud Mary. 1843–1878. Second daughter of late Queen Victoria. Married Louis, Grand Duke of Hesse, July 1st, 1862. Her fourth daughter, Alix Victoria, is now Empress of Russia.

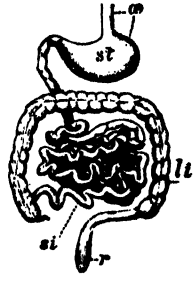
Alien, (A) a child born abroad of a foreign father (unless the child's paternal grandfather was a natural born subject), or (B) the child of an alien enemy, born in the United Kingdom. At common law aliens were subject to very many disqualifications, the nature of which will appear from the Statute of 1844, which greatly relaxed the law in their favour. This Act has, along with many others, been repealed by the Naturalisation Act, 1870, which enacts (subject to certain provisos) that real and personal property may be acquired or disposed of by an alien in the same manner as by a natural-born British subject, and that a title to real and personal property may be derived from an alien in the same manner as from a natural-born British subject. The Act also enables naturalised aliens to divest themselves of their status in certain cases, and enables British born subjects to resign their claim to be regarded as such; and while it enables British subjects to renounce allegiance to His Majesty, provides for their readmission to British nationality, and contains enactments with respect to the national status of women and children. An alien is disqualified both for the Parliamentary and municipal franchise, and also from being a member of either House of Parliament or of the Privy Council. An Aliens Act was passed in 1905 with a view to checking the immigration of undesirable aliens. In France a child born of foreign parents is an alien. In the United States children born abroad are not aliens provided their fathers are citizens. An alien, though not in possession of the same political and municipal rights as a citizen, is protected as regards person and property. [ALLEGIANCE.]

Alignment, *military*, the art of adjusting by means of a line, or the state of being so adjusted.

Aligurh, or ALIGARH, a district of the Meerut Division in the N.W. provinces of British India. It comprises the flat country between the Ganges and the Jumna, and contains 1,964 square miles. The Kali Nadi flows through it, and the chief town is Koel. *The Fort of Aligurh* stands on the Grand Trunk Road about 50 miles N. of Agra.

Alima (*Kunja*), a tributary of the Congo, flowing through French territory and joining that river on the right bank (lat. 1° 50′ S., long. 16° 50′ E.). The source is near Ogowe springs, and the stream has first a N. and then an E. course.

Alimentary Canal, the passage the food traverses from its entrance at the mouth to its final discharge as refuse material of no further service in the animal economy. It is lined throughout by mucous membrane, and comprises, in turn, the mouth, fauces, pharynx, œsophagus or gullet, stomach, small intestine (consisting of duodenum, jejunum and ileum), and large intestine (which includes the cæcum, colon, sigmoid flexure, and rectum), and terminates at the anus. For special descriptions of the parts of the alimentary canal, the different headings referred to may be consulted. The total length of the digestive tube in man is about thirty feet.



ALIMENTARY CANAL.
œ, œsophagus; *st*, stomach; *li*, large intestine; *si*, small intestine; *r*, rectum.

Alimony, the proportional part of a husband's income which is granted to a wife during a matrimonial suit between them, and also that allowance granted her after the suit is over. A wife is not entitled to alimony if she elope with an adulterer or desert her husband without adequate reason.

Aliquot part of a number, any whole number that will divide exactly into it. Thus the aliquot parts of 12 are 2, 3, 4 and 6.

Alison, SIR ARCHIBALD, Bart., a political and historical writer, born at Kenley in Shropshire, of which place his father was vicar, in 1792. During his infancy the family returned to Edinburgh, and he was educated at the university there and called to the Scottish bar. He prospered at first, but when the Tories went out in 1830 his chances of promotion fell, and he took to literature with great industry. Besides contributing largely to *Blackwood's Magazine* and writing a number of volumes on various

economical and biographical subjects, he devoted himself mainly to the composition of his *History of Europe from the French Revolution to the Fall of Napoleon*, a work of immense labour, though inaccurate, dull, and prejudiced. The first two volumes appeared in 1833, and speedily won him the esteem of those sections of the public to whom the French Revolution was nothing but a hideous nightmare and the progress of democracy a fact to be ignored. The lack of judgment and candour is still more visible in the *Continuation*, which brings the record up to 1852 and was published in 1855. Disraeli said that the object of the work was to show that "Providence is always on the side of the Tories." Peel made Alison sheriff of Lanarkshire in 1834, and he spent the rest of his life in well-regulated toil at Possil House, near Glasgow. In 1845 he was elected Lord Rector of Marischal College, Aberdeen, and in 1851 Rector of Glasgow University. Lord Derby conferred a baronetcy upon him in 1852, and he died in 1867, working almost to the very last. He married in 1825 Miss Elizabeth Tytler, and left several children, of whom General Sir A. Alison (1852–1907) was the eldest and most distinguished.

Aliwal, a village on the left bank of the Sutlej, 20 miles from Loodiana, in the Punjab, Upper India. Here, in 1846, Sir Harry Smith attacked the Sikhs under their sovereign Runjeet Singh, and, though their force of men and guns was twice as great, defeated them utterly.

Alizarin ($C_{14}H_8O_4$), a red colouring matter obtained from the madder root (*Rubia tinctorum*), in which it exists in the form of a *glucoside* termed *Ruberythric Acid*, a substance which is split up by a natural process of fermentation into Alizarin and Glucose. Alizarin, identical in chemical composition with that obtained from the madder root, is now prepared artificially from the *Anthracene* of coal tar. It is a red crystalline substance which is little acted on by water, but readily dissolved by benzine and ether. It acts as a weak acid, forming *Alizarates* with metallic bases. Is of great importance in dyeing.

Alkali, a name originally given to the ashes of seaweeds; but now applied to other substances which possess the properties which are characteristic of seaweed ash, and including the compounds of the five so-called Alkali metals, *Potassium*, *Sodium*, *Lithium*, *Rubidium*, and *Cæsium*, and the metallic radicle *Ammonium*, with Hydrogen and Oxygen. Alkalis are marked by great solubility in water, the power of neutralising and being neutralised by acids to form *salts*, the property of reddening blue litmus paper, of precipitating the heavier metals from their solutions as oxides, and finally, by their general corrosive action on organic bodies. The determination of the amount of Alkali in a given substance is termed *Alkalimetry*, and is precisely analogous in method to that of Acidimetry already described.

Alkaline Earths, the metals *Barium*, *Strontium*, and *Calcium* are known as the metals of the alkaline earths. The compounds of these metals are somewhat alkaline in their properties; but are distinguished from the true alkalis by their comparative insolubility in water. *Lime* (Oxide of Calcium) is the principal alkaline earth which occurs in nature.

Alkaloids, *Organic Bases*, or *Organic Alkalis*, a series of bodies of vegetable origin which are distinguished both by their similarity in properties to the alkalis proper, and also by their toxicological importance. They contain, as a rule, *Carbon*, *Hydrogen*, *Oxygen*, and *Nitrogen;* though in some cases the oxygen is absent. They have, for the most part, a marked alkaline reaction. Many of them are exceedingly poisonous. A very large number of natural alkaloids have now been discovered. For the most part they are crystalline solids which have a pronounced physiological action. Many of the most powerful and useful drugs are alkaloids; among such are aconitine, atropine, caffeine, morphine, quinine, physostigmine, pilocarpine, and strychnine. Alkaloids act as bases, forming salts with acids, thus we have sulphate of quinine, citrate of caffeine, hydrochlorate and acetate of morphine, and so on.

Alkanet, the commercial name of two distinct plants, both used in dyeing. *True Alkanet* is obtained from the *Lawsonia inermis*, the macerated leaves of which yield a yellow dye. *False Alkanet*, obtained

ALKANET. (*Anchusa tinctoria.*)

from another plant the *Anchusa tinctoria*, is the more important of the two; it furnishes a brilliant violet dye, and contains a violet colouring matter known as *Anchusin*.

Alkmaar or ALCKMAAR, a well-built and fortified town in North Holland, of which it is the capital. It does the largest cheese trade in the Low Countries, besides enjoying a considerable share of other business. In 1573 the Spaniards laid siege to the place, but were obliged to abandon the attempt after ten years. The Duke of York, commanding an Anglo-Russian force, capitulated here in 1799 to the French.

Alkmaar, the Dutch versifier of the satirical poem, *Reynard the Fox*, was in the service of the

Prince Bishop of Utrecht, and of Réné, Duke of Lorraine, in the latter part of the 15th century. His work was printed at Lubeck in 1498.

Alkoran. [KORAN.]

Allah, the name of God, used by the Arabs and Mohammedans generally. It signifies literally, "The (Being) worthy to be adored."

Allahabad (*the City of God*), also known as AKBARABAD, a city in the N.W. Provinces of India, which gives its name also to a division and a district, of both of which it is the capital. Situated at the confluence of the Ganges and Jumna rivers, 550 miles from Calcutta, Allahabad has, from earliest times, been of great strategical and commercial importance, besides holding the highest place in the veneration of the Hindus, many thousands of whom come yearly to bathe in the holy waters. Now that the railway systems of Eastern and Western India converge to this point the city has immensely increased in population and consequence. The fortress commanding the junction of the rivers was founded by Akbar, in 1583, taken by the British in 1765, restored to the Nabob of Oude in 1771, and finally ceded to England in 1807. It is two miles distant from the city, and contains the remains of a fine palace built by Akbar. Other noteworthy monuments are the Great Mosque and the Caravanserai of the Sultan Khossore. The district of Allahabad is 85 miles long by 50 broad, with an area of 2,833 square miles, and a population of about a million and a half. It is well watered and luxuriantly productive.

Allan, SIR WILLIAM, a Scottish artist who flourished in the early half of the 19th century. Originally apprenticed to a coach painter, he entered the Trustees' Academy, where Wilkie was his fellow student. He afterwards worked at the Royal Academy, and exhibited in 1803. Not finding the appreciation he expected he went to St. Petersburg, where he met with ample employment as a portrait painter. In his leisure he visited Tartary, Turkey, and the Black Sea, returning home in 1814. He then painted *Knox admonishing Mary Queen of Scots*, and *The Parting of Charles Stuart and Flora Macdonald*, besides many other pictures, but without attracting favourable notice till Sir Walter Scott took him up, and in 1825 *The Murder of the Regent Murray* won him the Associateship of the Academy, of which in 1835 he received the membership. In 1838 he was chosen president of the Scottish Academy, and in 1842 he was knighted, and appointed H.M. Limner for Scotland. He died in 1850.

Allantois, one of the fœtal membranes present in the embryos of reptiles, birds, and mammals. It commences as an outgrowth from the hinder portion of the intestinal canal, which gradually enlarges, insinuating itself with its vessels between the amniotic folds, until it comes into contact with the shell membrane. In birds the allantois undergoes considerable development and serves as an aerating organ to the growing embryo, which it completely envelops. In man and mammals the allantoic vessels are only distributed over part of the outer membrane, that part, namely, where the placenta (q.v.) will be formed. The internal part of the allantois persists in man as the urachus (q.v.). Of the five groups of vertebrate animals, two, namely, fish and amphibia, have no allantois.

Alleghany mountains, a section of the APPALACHIAN mountains stretching from Cape Gaspé, on the Gulf of St. Lawrence, to Alabama, in the Gulf of Mexico, a distance of 1,300 miles. The Appalachians are divided into the *Northern*, from Cape Gaspé to New York, includes the Adirondacks, the Green and the White Mountains; the *Central*, from New York to the valley of the New River, contains part of the Blue Ridge, the Alleghanies proper, and many smaller parallel ranges; the *Southern*, from the New River to the Gulf of Mexico, embraces the smaller half of the Blue Ridge, the Black, the Smoky, and the Unaka Mountains. The system then traverses many states, and forms the watershed between the basin of the Mississippi and the rivers flowing into the Atlantic. The average height of the component ranges is under 3,000 feet, but Mount Washington, in New Hampshire, rises to 6,620 feet. Geologically the Alleghanies are made up of granite, gneiss, mica, clay, slate, and primary limestones. They contain valuable mines of coal and iron, and are usually wooded to their summits, and intersected by rich valleys. The Alleghanies form the northern section of an enormous plateau which gradually merges into the Mississippi basin.

Alleghany, a river of Pennsylvania, North America, which unites with the Monongahela at Pittsburg and forms the Ohio. Above Pittsburg it is navigable for 200 miles.

Allegiance, the duty of a subject to his or her sovereign. According to the general policy of nations a subject may not renounce allegiance even by emigration or naturalisation in another country, but this general law is in some cases modified by statute. The oath of allegiance is the oath which every subject may be called upon to take, and which is usually taken either upon assuming the higher offices of State or judicial and some other offices. In the United States the oath is simply of obedience to the constitution, and with it is implied, in the case of persons applying for naturalisation, the renunciation of native allegiance to any other sovereign power. In England the oath of allegiance is to be faithful, and to bear true allegiance to the Sovereign.

Allegory, a discourse which it is not intended should be taken literally, but as conveying a meaning other than the one actually expressed. Allegories may also be frequently expressed by paintings, sculpture, and the like. The most celebrated allegories in the English language are undoubtedly Spenser's *Faerie Queene* and Bunyan's *Pilgrim's Progress*. An allegory differs but little from a *parable*, or a *fable*, and is simply a kind of extended *metaphor*.

Allegretto, in music, a tempo livelier and brighter than *andante* (q.v.), but not so quick or brilliant as *allegro*.

Allegro, a quick measure of time in music, which may be modified by additional adjectives, such as *agitato, moderato, giusto*, etc. It is between *andante* and *presto*. Like *andante* and *adagio* it may be used as a substantive signifying a particular movement whose tempo is *allegro*.

Alleine, RICHARD, born in 1611 at Ditcheat, Somerset, where his father held preferment, and educated at Oxford, was for twenty years rector of Batcomb, but was ejected after the Restoration as a nonconformist. He died in 1681. Of his many religious treatises the best known is entitled *Vindiciæ Pietatis*.

Allemande, a slow, solemn air in common time; also a dance in triple time, very similar to the waltz.

Allen, BOG OF, a name which embraces all the bogs of peat and moss E. of the Shannon in King's County and Kildare, Ireland. These extend over 348,500 acres, and have an average depth of 25 ft. The rivers Boyne, Barrow, and Brosna have their sources here, and the Grand Canal traverses the district.

Allen, ETHAN, one of the earliest champions of American independence, born in Connecticut, 1737. Raising a Vermont corps, he took Ticonderoga in 1775, but in the attack on Montreal he was made prisoner, carried off to England, and only released after the Convention of Saratoga. He spent his remaining years in Vermont, where he wrote several books. He died in 1789.

Allen, JOHN, D.D., Archbishop of Dublin, educated at Oxford for the priesthood, and in 1515 sent by Archbishop Warham as his agent to Rome, where he resided nine years. For a brief period he was Lord Chancellor of Ireland. In 1534, during the insurrection of Thomas Fitzgerald, "the Silken Lord," Allen tried to escape from Dublin on board ship. He was stranded at Clontarf, seized by the rebels, and murdered.

Allen, LOUGH, a lake in the province of Connaught, Ireland, nine miles from Carrick. It is commonly regarded as the source of the Shannon.

Allen, WILLIAM, a distinguished chemist and a Christian philanthropist, born in 1770, being the son of a Spitalfields weaver. He received little or no education, but abandoning his father's trade, took a place in the well-known druggist's house in Plough Court, and by sheer industry he became a partner. He held the office of lecturer in chemistry at Guy's Hospital for many years, made some important discoveries, such as the true constitution of the diamond, and was elected Fellow of the Royal Society. Allen had been reared from his youth in the principles of the Society of Friends, and like so many of that sect, he devoted his wealth and energies to humanitarian objects. The reform of the English criminal law, the extinction of slavery, the establishment of savings banks, the extension of vaccination, were among many interests that claimed his attention. He worked personally amongst the poor, and even did mission work in foreign countries, persuading the Czar to have the Scripture taught in Russian schools. For years he was treasurer of the British and Foreign School Society. He died in 1843.

Allentown, U.S.A., and up to 1838 called Northampton, is situated on the W. bank of Lehigh river, Pennsylvania. Its most important industry is the production of iron. It has two colleges, one being exclusively for women. The town was founded by W. Allen, hence its name.

Allerion, a term used in heraldry signifying an eagle with expanded wings with their points turned downwards and no beak or feet.

Alleyn, EDWARD, an actor, born in 1566. He founded Dulwich College, which obtained the royal charter in 1619. He died in 1626.

All Fools' Day, the 1st of April. [APRIL FOOL.]

All-hallows, All-halloween. [ALL SAINTS' DAY.]

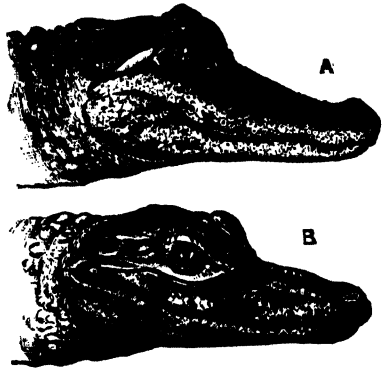
Allia (now Fiume di Conca), an Italian stream rising 11 miles from Rome, and flowing through the Sabine plain into the Tiber. Here in 387 B.C. the Romans were defeated by the Gauls under Brennus.

Alliance, a treaty or compact formed between independent nations or powers. For particular alliances see different headings, HOLY ALLIANCE, TRIPLE ALLIANCE, etc.

Allier, a department in the centre of France, between Cher and Nièvre on the N. and Puy de Dôme on the S., having an area of 2,821 square miles. The country as a rule is undulating and fairly wooded, but is traversed by two granite spurs from the Cevennes and the Mountains of Auvergne respectively. Coal, iron, antimony, marble, limestone, etc., are found. The mineral waters of Vichy and Néris are well known. Moulins, the capital, is the seat of a bishopric. *Allier* (Lat. *Elaver*), the river from which the Department is named, rises in the Cevennes, Department Lozère, and after traversing Haute Loire, Puy de Dôme, and Allier, joins the Loire just below Nevers. Its total length is 200 miles.

Alligator, a genus of crocodilian reptiles, constituting a family (Alligatoridæ), used also for any individual of the first section described below. They range from the Lower Mississippi and Texas through tropical America, with one Chinese species (*A. sinensis*). The head is shorter and broader than in the true crocodile; the teeth are very unequal, and the first and fourth teeth in the lower jaw fit into cavities in the upper jaw; the hind legs and feet are round, neither fringed nor pectinated at the side, and the toes only partially webbed. The genus may be divided into three sections—true Alligators, Caimans, and Jacarés (to which some systematists give generic rank, while others combine the Caimans and Jacarés in a single section). The best known species of the first section is the Pike-headed Alligator (*A. mississippiensis*), from the region of the Mississippi. It is from 14 to 15 feet long, of which

the head is about one-seventh—greenish-brown above, yellow beneath, with alternate bands of these colours on the sides; the snout is broad, flat, and rounded in front; the nostrils are separated by a bony knob; the armour of the back is not articulated, none on the ventral surface; eyelids fleshy. The Chinese species belongs to this section, and is closely allied to the Pike-headed Alligator, but has the bony plate in the eyelid like the Caimans. The first notice of the existence of a Chinese crocodilian appeared in the *Proceedings* of the Zoological Society, in 1870. Some nine years later a stuffed specimen was sent to the Paris Museum; and in 1890 two living specimens were received and exhibited at the Zoological Gardens, Regent's Park. The Caimans range from Mexico through tropical South America; the head is high, angular, and flat at the sides; nostrils undivided; eyelids strengthened by an internal bony plate; bony dorsal and ventral scales articulated; webbing between toes rudimentary. The Jacarés, with numerous species ranging from 2 to 13 feet in



ALLIGATOR.
A, *Alligator Mississippiensis*; B, *Caiman sclerops*.

length, have the same geographical range as the caimans, from which they differ little, except in having fewer teeth, and the eyelids striated or rugose. Their flesh is often eaten. In structure and general habits these animals resemble the crocodile. They feed principally on fish, but Bates describes them as troublesome in the dry season, when "there was always one or two lying in wait for anything that might turn up at the edge of the water." Alligator oil is utilised by the Indians for burning in lamps, and the skin forms the "crocodile leather" of commerce. [CROCODILE.]

Alligator Pear. [AVOCADO PEAR.]

Allingham, WILLIAM, a poet born in 1828; his most celebrated works are *Day and Night Songs* (1854), and *Lawrence Bloomfield in Ireland* (1864). He died in 1889.

Alloa, a sea-port in Clackmannan, Scotland, six miles below Stirling, on the N. of the Firth of Forth. It has a good harbour and capacious docks, iron-works, glass-houses, distilleries, and weaving mills. "Alloa ale" is famous all over Scotland.

Allobroges, a race of Gauls who dwelt in the country between the Rhone and the Lake of Geneva. Their capital was the town of Vienna. They made common cause with Hannibal against Rome, and were a constant source of irritation and annoyance to the Republic.

Allodium, a legal term signifying landed property for which the owner has to pay no rent or service to a superior. *Allodial tenure* is thus distinguished from feudal tenure. The only places where allodial tenure exists in Britain is in certain portions of Orkney, and even about these authorities differ.

Allopathy. [HOMŒOPATHY.]

Allophane, a rare but interesting mineral, a hydrated aluminium silicate, $Al_2O_3SiO_2 + 5\,Aq.$ It is not crystalline, but occurs in reniform or botryoid masses, white, yellow, red, brown, blue, or green in colour, traces of copper and iron oxide being present. It is waxy and translucent, and breaks with a conchoidal fracture. It is found in crevices near the top of the chalk at Charlton and Burham in Kent, at Beauvais and at several German localities. It is suggested that allophane, and the silicate of iron forming the green coating of the flints resting on the chalk, have originated from the superincumbent clay, or that in the chalk, with iron oxide and water, thus:—

$$\underset{\text{iron oxide}}{Fe_2O_3} + \underset{\text{clay}}{Al_2O_3.2SiO_2.2Aq.} + \underset{\text{water}}{3H_2O} =$$
$$\underset{\text{iron silicate}}{Fe_2O_3SiO_2} + \underset{\text{allophane.}}{Al_2O_3SiO_2.5Aq.}$$

Allophylian, a term introduced by Prichard to denote the peoples of Europe and Asia who are neither Aryan nor Semitic, and the languages spoken by them. It is sometimes used to include all races outside those families, and sometimes made an equivalent of Turanian.

Allotments, small portions of land let out to labourers to cultivate in their spare time. They are believed to be a valuable means of promoting thrift, industry, and sobriety, and therefore the Legislature in 1887 endeavoured to encourage the extension of the system by passing "an Act to facilitate the provision of allotments for the labouring classes," and later Acts, all being embodied, amended and enlarged by a further Act which came into force Jan. 1, 1909. Previous to 1887 it depended entirely on the landowners whether land should be let out in allotments or not. By this last Act freedom to withold sale of land is taken from the landlords, and power vested in Parish or County Councils to compulsorily acquire ground and grant loans for purchase. If the proper authority in any district is satisfied that a demand for allotments exists in that district, and that such allotments are not procurable voluntarily, they can move the county authority to compel landlords to sell or let suitable land. To purchase such land the County Councils have power to borrow from the Local Government Board, London. Formerly a community, to get the authority to act, had to get six registered parliamentary electors, or resident ratepayers, to sign a

representation to the authority that such allotments are required, but by the 1909 Act no such concerted action is necessary. If the Parish Council or County Council observes a demand, it may then buy or hire available and suitable land, so long as it does not incur expense beyond what it may reasonably hope to recover from rents. It may not take land belonging to a park, pleasure-ground, or garden, nor can it touch the property of a railway or canal company, if such property be used in the company's undertaking. The maximum size of an allotment is five acres, and the rents are fixed at a figure sufficient to ensure the local authority against loss. Councils must satisfy themselves that an applicant can maintain the allotment asked for. The official report issued in 1909 gave the applicants for the previous year as 21,540, who asked for 15,695 acres in the aggregate. Under the 1908 Act small holdings up to 50 acres can also be acquired, and for which there were 23,285 applications during the year.

Allotropy, or *Physical Isomerism*, the term applied to the property possessed by many substances of differing in physical attributes, while remaining identical in chemical structure. Thus the *Allotropy of elements* is illustrated by the differences of crystalline form, colour, etc., which are assumed by the same element under different conditions, viz. the different varieties of carbon (as charcoal, graphite, and diamond), phosphorus, and sulphur. The *Allotropy of compounds* is illustrated by the varieties of silica (quartz, agate, and amorphous silica), mercuric sulphide (red and black), and so on. As a rule, the passage of one allotropic form into another is closely connected with change of temperature.

Alloway, a parish in Ayrshire, Scotland, celebrated as containing the ruins of "Alloway's auld haunted kirk" that plays so important a part in the *Tam o' Shanter* of Robert Burns.

Alloy, originally a mixture of metals in which gold or silver formed one of the ingredients. It is now applied to any mixture of metals. Many alloys melt at lower temperatures than either of the constituent metals.

All Saints' Bay, a fine inlet, 37 miles long by 27 broad, on the coast of Brazil about 13 degrees S. of equator. The city of Bahia or San Salvador is on its E. side.

All Saints' Day, formerly called All-hallows, a festival of the Church instituted early in the seventh century on the occasion of the transformation of the Roman Pantheon into a Christian church dedicated to the Virgin Mary and all the martyrs. It is kept on the 1st of November.

All Souls' Day, the 2nd of November, a festival of the Romish Church, held to commemorate all the Faithful deceased. It was originated by Odilon, Abbot of Cluny, in the eleventh century, and at first only carried out by his own order, but very soon spread through the whole Church.

Allspice, or PIMENTO, the dry berry of *Pimenta officinalis*, Lindl. (*Myrtus Pimenta*, or *Eugenia Pimenta*), a West Indian evergreen tree belonging to the Myrtle family. Great Britain imports about 2,000 tons annually of these berries from Jamaica, whence she derives her sole supply. They yield on distillation about 4 per cent. of a pungent aromatic oil, resembling oil of cloves. From an allied species, *P. acris*, oil of bay, or bay-berry oil, used in the United States in the manufacture of bay rum, is obtained.

Allston, WASHINGTON, a painter and poet, born in S. Carolina, 1779, studied under West at the Royal Academy of London, and then visited Paris and Rome. His picture, *Jacob's Vision*, attracted much notice. Returning to America, he married a sister of Dr. Channing, and revisiting England he took the prize at the British Institution, the subject being *Dead men raised by Elisha's bones*. He settled down near Cambridge, Massachusetts, where he painted and wrote. Coleridge admired his literary productions, which included a volume of poems, a romance, and a series of lectures. His death occurred in 1843.

Alluvium, the soil formed by the sediment brought down by rivers and spread by their action, especially when in flood, over level tracts. Such tracts occur mostly in the lower parts of the course of a river, and in traversing them its course will be comparatively slow, whilst in the approximately stagnant and shallow water of floods deposition will be specially facilitated. Alluvium consists largely of fine-grained loam or brick-earth, with river sands and gravels mainly in former channels, and even occasionally extensive stretches of shingle. It may often contain beds of freshwater or estuarine shells, layers of peat or lignite, formed from swamp vegetation bordering the river, or local accumulations of drift wood from such natural rafts as those produced by trees blown by wind into the waters of the Mississippi. More violent floods, such as those produced by the blocking by ice of the mouths of such rivers as those that flow northward into the Arctic Ocean, may carry coarse gravel and deposit it in considerable thicknesses. The deltas of rivers are entirely alluvial in origin, the rivers cutting their way in numerous channels through the matter which they themselves previously deposited. The whole of Lower Egypt and of Holland is thus comparatively modern alluvium.

Alma, a small river and village on the W. coast of the Crimean Peninsula, Russia, rendered memorable by the victory gained there (Sept. 20, 1854) by the allied French, English, and Turkish armies, under Marshal St. Arnaud and Lord Raglan, over the Russians, commanded by Prince Menschikoff.

Almack's (so called from the original proprietor), the former name of the suite of assembly rooms afterwards known as Willis's Rooms. They are situated in King Street, St. James, and were first opened in 1770, and were famous until 1840 for the very select balls that used to be given there. So select indeed was the company, that to be seen at Almack's was regarded as a certificate of good social standing.

Almaden, a town in the province of Ciudad Real, Spain, where there exist ancient and productive mines of quicksilver, the property of the Spanish crown, but once rented by the Rothschilds. An excellent School of Mines is established here.

Almagro, DIEGO D', born 1475, joined Pizarro, in 1525, in his first abortive attempt to penetrate into Peru, and afterwards shared with him in the conquest of that country, though jealousies had long since prevailed between the two leaders. Almagro was charged with murdering the Inca, Atahualpa. In 1534 he commenced the subjugation of Chili. A little later he rescued Pizarro's brothers from the Indians who besieged them at Cuzco, but when he was refused entrance into the city stormed it himself. Pizarro sent a force which defeated him and took him prisoner. After long incarceration he was strangled in 1538. His son avenged his death by killing Pizarro, but was himself executed at Cuzco in 1541.

Almagro, the capital town of a district in the province of Ciudad Real, Spain. It is celebrated for the manufacture of lace, and for an annual mule-fair.

Alma Mater (literally, the nourishing or fostering mother), a term often applied to the university at which one has studied.

Almanack, or ALMANAC, properly a calendar setting forth the days of the year and their recognised divisions, together with notifications of astronomical phenomena and of ecclesiastical, civil, and other fixtures; forecasts of future occurrences and chronological records of past events being often introduced. Later on the original purpose was not seldom lost sight of in such publications, which then became magazines or annuals devoted to some particular branch of science, art, or information. Thus we have the *Almanach de Gotha*, a kind of European peerage, the *Musen Almanak*, a collection of German poetry, and sundry well-known compilations that aim at giving almost cyclopædic views of human affairs. The origin of the word cannot be satisfactorily traced. At first sight it would seem to be made up of "al," the Arabic demonstrative, and some root (Heb. *manah*; Arab. *manay*) signifying "to reckon." But no such compound has been proved to exist in Arabic, whilst it is certain that Eusebius in the third century used *almenacha*, with its modern signification. Tables or calendars must have been one of the first-fruits of primitive civilisation amongst many nations, but references to them in ancient authors are scanty. Such contrivances were usually kept secret by priestly castes in the earlier stages of social development. In Rome, for instance, the *pontifices* preserved the *fasti* a mystery until 300 B.C., when Cn. Flavius published them on wooden tablets. So long as few men could read or write, cubes of stone or wood engraved with lines to note the days and with special marks to indicate fasts, festivals, changes of the moon, and so forth, amply supplied popular needs. The Farnese "rustic calendars" and our own "Clogg Almanacs" are specimens of these rude inventions. Of more elaborate schemes we hear nothing until the twelfth century. Roger Bacon (1292), Peter de Dacia (1302), Walter de Elvenden (1327), and John Somers (1380) were the authors of the most celebrated calendars of this period, some of which are preserved in the libraries of Oxford, Cambridge, and the British Museum. They were based for the most part on cyclical arrangements of time in accordance with lunar movements. The introduction of printing naturally stimulated this kind of literary activity. Perhaps the earliest printed almanack was that of Regiomontanus published at Nuremberg in 1472. Pynson's *Kalendar of Shepardes* (1497) was the first that appeared in England, and Tybalt's *Prognostications*, issued forty years later, won high repute. Nearly all of these productions claimed the gift of prophecy by virtue of astrological lore or occult power. Elizabeth granted a monopoly of almanac-printing to the Stationers' Company, who retained this right until 1775, when the judges decided that the concession was *ultra vires*. In the meanwhile a great number of publications had issued from the press, chief among them being *Lilly's Ephemeris* (1644), *Poor Robin's Almanac* (1652), *The British Merlin* (1658), *The Edinburgh Almanac* (1683), *Moore's Almanac* (1680 ?), and *The Lady's Diary* (1705). In not a few cases humour of the coarsest quality and woodcuts to match were mixed up with more wholesome or useful matter; but a heavy stamp duty imposed in 1710 checked for over a century the excessive circulation of this class of literature. By far the most valuable compilation of them all was *The Nautical Almanack* started by Dr. Neville Maskelyne in 1767, remodelled under the auspices of the Royal Society in 1830, and continued to this day. Hone's *Every Day Book*, published in 1826, was a new departure in another direction. The Society for the Diffusion of Useful Knowledge awoke in 1828 to the mischief that was being done by the diffusion of superstition, error, and bad taste under the guise of popular information, and brought out *The British Almanack* followed by *The Companion to the Almanack*. The Stationers, still the owners of the majority of the copyrights, strove to excel their rivals with *The English Almanack*. In 1834 the stamp duty was abolished, and from that date the quantity and quality of such periodicals have grown year by year. *Whitaker's Almanac*, published yearly, was started in 1869, and has since then gradually been enlarged, until it is now a most valuable handbook of useful information.

Almansa, a town of Spain, in the province of Albacete, formerly part of the kingdom of Murcia. During the war of the Spanish Succession (1707) the Earl of Galway was defeated by the Duke of Berwick with a French army, close by. The population is engaged chiefly in the manufacture of cotton fabrics, leather and soap.

Almansur (Arab. *Al-Mansur*, The Invincible), a title borne by several Mussulman princes. *Abou Giafar-Abdallah Al-Mansur*, the second Caliph of the Abbassides dynasty, began to reign in 753. He had to leave Spain to the rival dynasty, but he gained ground in Persia and Asia, founded Bagdad,

and made it his capital. He was the first Caliph who protected literature and science. He died on the way to Mecca, in 775.

Al-Mansur, MAHOMMED, a great Moorish warrior in Spain at the end of the 10th century. He took Leon and Barcelona, drove the Christians out of Portugal, entered Galicia, and seized the shrine of St. James of Compostella, but was himself defeated in turn, and died 997.

Almeida, DON FRANCIS D', the first Viceroy of the Portuguese possessions in India, 1505. On his way out he took Quiloa and Mombaça, and landing on the Malabar coast, established himself as Viceroy at Cochin. His son, Lorenzo, in the meantime, reduced Ceylon, and later on routed the Mohammedans at sea, but was slain in an engagement with Hussein, Admiral of Egypt, and the Rajah of Calicut. At this juncture Albuquerque was sent out to supersede the elder Almeida, who, before yielding up his place, avenged his son's death by completely destroying the united fleets of the enemy off Diu. In 1509 he set sail for Europe, and landing for water in Saldanhas Bay at the Cape was killed by a native spear.

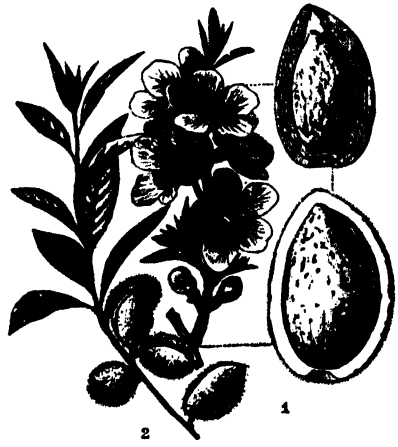
Almeida, a strong fortress in the province of Beira, Portugal, near the Coa river, and 113 miles N.E. of Lisbon. In 1808 it was surrendered by the French, but Massena recaptured it by a surprise in 1810. In 1811, after the hard-fought battle of Almeida, Wellington occupied the town again.

Almeria, a province and capital town in Spain. The province, carved out of the kingdom of Granada, has an area of 3,300 square miles. Its seaboard was once the haunt of pirates. The interior is mountainous, but the valleys produce quantities of grapes, sugar, and maize, and the uplands pasture large herds of cattle. There are mines of copper, iron, silver, and mercury. The City of Almeria (*Portus Magnus* or *Murgis*) is situated on the spacious bay of that name. The streets are narrow displaying many specimens of Moorish architecture, but there are several fine squares. Under the Moors Almeria was very rich and important, and after the fall of the Caliphate of Cordova was the capital of a small kingdom. It passed into Christian hands in 1143. The trade is principally in barilla, lead, and esparto.

Almiqui. [AGOUTA.]

Almodovar del Campo, a pretty town 20 miles from Ciudad Real, in the province of New Castile, Spain. Its population is employed in agriculture, in the manufacture of lace and other tissues.

Almond, the seed of *Amygdalus communis*, a small tree belonging to the Drupaceous subdivision of the rose family, native to North-West Africa and perhaps also of Western Asia. The flowers are solitary and generally pink, and appear before the lance-shaped leaves, which in the bud are folded in halves. The fruit is egg-shaped, downy externally, with a tough, fibrous mesocarp, and a wrinkled stone. It has long been widely cultivated, and many varieties exist, differing in the hardness of the stone and in the flavour of the seed. Sweet Almonds (*A. communis*, var. *dulcis*) include the large thin-shelled Jordan (from the French *jardin*), the Valencia Almond, imported as a dessert fruit from



ALMOND (*Amygdalus communis*), (1) fruit and (2) blossom.

Malaga, and the smaller Barbary and Italian forms. The Bitter Almond (var. *amara*) yields an essential oil, employed in confectionery, but dangerous from sometimes containing prussic acid.

Almonds, OIL OF, the fixed oil obtained by pressure from sweet or bitter almonds. It consists mainly of olein (S.G. ·918), solidifies at 25° C., is fairly soluble in alcohol, and mixes with ether in all proportions. An essential oil is also obtainable from bitter almonds; it is not present under natural conditions, but is produced by the action of a nitrogenous ferment called *Emulsin* on the glucoside *amygdalin* of the almonds; it is used for flavouring custards, etc., but is no longer employed medicinally. Sweet almonds contain amygdalin, but no emulsin, and therefore do not yield a volatile oil.

Almond-shaped Implements. [FLINT IMPLEMENTS.]

Almoner, one who distributes alms; generally a religious functionary. Before the Revolution the *Grand Almoner* in France was the highest ecclesiastical officer. The Lord High Almoner in England (usually a bishop) distributes the royal bounty twice a year.

Almora, the administrative capital of Kumaun, a division of the N.W. provinces of British India lying at the foot of the Himalayas. The town stands 5,337 feet above the level of the sea, 85 miles from Bareilly.

Alnwick (pronounced Annick), the county town of Northumberland, on the river Alne, from which comes its name. The old walls of the town can still be traced, and one of the four gates built by Hotspur forms the chief entrance. Large sums have been spent by the Dukes of Northumberland in repairing and enlarging the castle. The town has a station on the North-Eastern Railway,

a town hall, corn exchange, and all the other appurtenances of a centre of county business. Pop. (1901), 6,716,

Aloe, a liliaceous genus of about 150 species, mostly natives of Africa, Arabia, and adjacent islands, with rosettes of pointed, fleshy, radical leaves or unbranched stems eight to ten feet high.

ALOE (*A. succotrina*), (*a*) leaf and (*b*) blossom.

The bitter resin in the leaves is a valuable purgative. The chief species are *A. succotrina* of Socotra, *A. vulgaris*, the Barbadoes Aloe, cultivated in the West Indies, and *A. spicata*, Cape Aloe.

Aloes, a purgative derived from the juice of the leaf of certain species of aloe. The active principle is the substance aloin. There are several preparations of aloes in the Pharmacopœia, of which the compound decoction is one of the best known. This drug acts mainly on the lower bowel, and consequently many hours elapse before it produces its effect. It is said not to cause habitual constipation, and is, for that reason, in high favour, forming an active ingredient of most purgative pills.

Alopecia, baldness. This may exist from birth or be due to a variety of causes. One of the commonest forms is *Alopecia arcata*, in which round shining patches, completely devoid of hair, are formed on the scalp. In rare cases the affection is universal, every hair in the body disappearing. The disease has been ascribed to the ravages of a microscopic fungus, but on this point authorities differ. Benefit has been said to be derived from blistering where the patches are localised, but for general baldness little can be done in the way of treatment. The innumerable specifics of which quacks sing the praises are not all harmless. Alopecia must not, of course, be confused, as is sometimes done, with ringworm.

Alora, a town in Andalusia, Spain, 23 miles from Malaga by rail.

Alost (Flem. *Aalst*), a town in the province of E. Flanders. Belgium, on the river Dender, which is navigable thus far, and 15 miles from Brussels on the railway to Ostend. The Church of St. Martin contains some fine pictures by Rubens, and the Town Hall is an interesting structure dating from the early 13th century. There are now large iron factories, and a good trade is done in lace, linen, wools, hops, and corn.

Alpaca (*Auchenia paco*), a ruminant of the Camel family, living on the Andes from the Equator to Tierra del Fuego, but most abundant on the lofty table-lands of Peru and Chili, where they graze in herds throughout the year, and are driven to the huts of the Indians to whom they belong only at shearing time. Some authorities consider the alpaca to be a distinct species, while others regard it as the partially domesticated form of the vicuna

ALPACA (*Auchenia paco*)

(q.v.). In general appearance it is not unlike a large, long-legged, long-necked sheep, with abundant long, soft silky wool, to which the name alpaca is also given, as well as to the textile fabric prepared therefrom. These animals vary greatly in colour, from black to shades of grey approaching dusky white, while many are of a yellowish brown. The manufacture of alpaca stuffs in England dates from 1836, when Mr. (afterwards Sir) Titus Salt commenced to weave it. Saltaire is still the principal seat of the industry. Since that time, however, the fabric has so grown in public favour, that now more than 2,000,000 lbs. are annually imported into Britain. Unsuccessful attempts have been made to acclimatise the alpaca in Europe and North America; and some years ago a herd was imported into Australia with no better result.

Alp Arslan, or AXAN (Pers. *The Brave Lion*), the second sultan of the Seljuk dynasty in Persia, came to the throne in 1063. He added Armenia and Georgia to his dominions, defeating the Greek Emperor, Romanus Diogenes, in 1071. Whilst invading Turkestan he was stabbed by Yussuf Rothual, the commandant of a fort on the Oxus, and died in 1073.

Alpes. Three departments in the S.E. of France take their name from the great mountain system of Europe, viz.:—I. Basses-Alpes; II. Hautes-Alpes; III. Alpes Maritimes.

I. *Basses-Alpes* is bounded N. by Hautes-Alpes, S. by Var, S.W. by Alpes Maritimes, W. by Vaucluse

and Bouches du Rhône, E. by Italy, and has an area of 2,680 square miles. The soil is sterile in the north, but the pasturages are good, and the mountains yield iron, lead, coal, jet, alabaster, and marbles. In the south oranges and other fruits grow abundantly, truffles are plentiful, and the silkworm is cultivated. Digne is the capital.

II. *Hautes-Alpes* is bounded E. by Italy, S. by Basses-Alps, N. by Savoie and Isère, W. by Drôme, and has an area of 2,158 square miles. The Cottian Alps, rising to an elevation of 14,000 feet, run right across the department, rendering the climate very severe. Snow lies in some valleys for seven months. The soil, too, is barren as a rule, but fruit trees thrive towards the south. There are mines of iron, copper, lead, and coal, and quarries of valuable stone. Gap is the chief town.

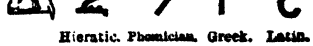
III. *Alpes Maritimes* is a newly-formed department, having been made up in 1860 from the territory of Nice ceded by Italy, together with Mentone and Roccobruna purchased from Monaco, and part of Var. It is bounded S. by the Mediterranean, E. and N. by Italy, W. by Var and Basses-Alpes. Though it is very mountainous, the Maritime Alps and their spurs filling all the north and centre, the mild climate of the coast district, the Riviera, draws invalids and pleasure-seekers from colder climates besides favouring the growth of oranges, lemons, and other fruits, early vegetables, silkworms, etc. The sea, too, yields sardines and anchovies, in which a large trade is done. The area is 1,482 square miles. Nice is the chief town. Mentone, Cannes, Grasse, Villefranche, and Antibes are all thriving and prosperous places. [ALPS.]

Alphabet (from the first two Greek letters *alpha*, α; *beta*, β; in their turn derived from the Semitic *aleph*, א; *beth*, ב), a collective name for the series of symbols used to express the elementary sounds of a language, and serving to form syllables and words. [PICTURE-WRITING.] The number of alphabets known to and catalogued by philologists is about 200, but of these only about fifty are now in use. The origin of the alphabet is a question which has occupied mankind for more than 2,000 years. Classic authors testified that the Greeks had received the gift of letters from the Phœnicians, who had obtained them from the Egyptians. Tacitus, in his *Annals* (xi. 14), is explicit on this point. He says:—"The Egyptians first depicted thoughts of the mind by the figures of animals, which oldest monuments of human memory are to be seen impressed on the rocks, so that they (the Egyptians) appear as the inventors of letters, which the Phœnician navigators brought thence to Greece, obtaining the glory as if they had discovered what they only borrowed." Comparison of the alphabets of modern Europe with that of ancient Greece made it clear that there was considerable resemblance between them; and no possible doubt could exist as to the derivation of the Latin alphabet from the Greek. The difficulty was to account for the origin of the Phœnician alphabet, and the dissimilarity between the Semitic letters and the Egyptian hieroglyphs was so great that men of science declined to receive the testimony of classic authors, and the problem seemed insoluble. In the eighth edition of the *Encyclopædia Britannica*, the article "Alphabet" concludes thus:—"Since we are unable, either in history or even in imagination, to trace the origin of the alphabet, we must ascribe it with the Rabbins to the first man Adam . . . or we must admit that it was not a human, but a divine invention."

Four years later this obscurity was dispelled by M. Emmanuel de Rougé in a paper read by him before the Académie des Inscriptions at Paris, in which, while admitting the futility of endeavouring to derive the Phœnician letters from Egyptian hieroglyphics, he showed that they were taken from an Egyptian hieratic script, so ancient that its use had been forgotten long before the Hebrew Exodus. This script had been invented by the priests, who found the elaborate hieroglyphics too troublesome for rapid delineation on papyrus, and consequently abbreviated them to a few rapid strokes. The chief authority for this hieratic script is a manuscript procured at Thebes and presented to the Bibliothèque Nationale at Paris by M. Prisse d'Avennes, and generally known as the "Papyrus Prisse." It was found in a tomb of the eleventh dynasty, and is undoubtedly the oldest book in the world. Its evidence is supported by one papyrus in the Berlin Museum, and by another in the possession of Professor Lepsius.

From this material, and with the standard alphabet of twenty-five characters as accepted by Egyptologists as a basis, M. de Rougé has shown how twenty-one of them were taken over by the Semites, only one new symbol *ayin* (ע) being added. There can be no certainty as to the place where or the time when this development was effected, though it probably originated with a Phœnician colony occupying the Delta some 4,000 years ago.

These conclusions (which are generally accepted by those whose studies have qualified them to speak on the subject) have supplied an answer to the objection that the Semitic letters could not have had an Egyptian origin, because, for example, the Semitic א was called *aleph* (= an ox), while the hieroglyphic whence it was said to be derived represented an eagle. But when the Semites thus "spoiled the Egyptians" by appropriating the hieratic characters they gave them Semitic names, each significant of some object more or less closely resembling the letter to which it was applied and commencing with that letter. The letter ג, *gimel* (of which the English *camel* is a transliteration and translation), offered some difficulty, as it presented no resemblance to a camel. Gesenius suggested that the Phœnician letter represented the camel's hump, and other scholars offered other solutions; but Dr. Taylor made the matter clear by placing the sketch of a kneeling camel by the side of the hieratic character. The resemblance is so close as to remove every objection; and the development of the Greek and Latin letters from the Phœnician is clear enough. The letters figured are the lapidary forms:—



Hieratic. Phœnician. Greek. Latin.

This acrologic principle, as it is called, is not peculiar to the Semites. It occurs in the Russian alphabet (borrowed from the Greek in the ninth century), and in many others, and is familiar in every English nursery in the rhyme:—

> A was an Archer, who shot at a frog;
> B was a Butcher, who had a great dog; etc.

From these twenty-two Semitic letters have been developed all the alphabets of the world, those of the Semitic family retaining the characteristics of the original in being written from right to left and in having no true vowels. In the Aryan tongues the writing is from left to right (though for some time the ancient Greeks wrote from right to left and from left to right alternately), and vowels have been developed out of the Semitic breaths and semi-consonants, so that while Disraeli's boast, "that the Semites gave the world its alphabet," is literally true, the Aryan race perfected that gift by the addition of vowel-signs.

The tradition that the Greeks derived their alphabet from the Phœnicians is established (1) by the similarity between the letters in the oldest Greek inscriptions and those in the early Phœnician records; (2) by the agreement in the order of the letters; and (3) by the adoption by the Greeks of Semitic names for their letters. From the older breaths *aleph* (א), *he* (ה), and *ayin* (ע), were developed the vowels *alpha* (α), *e-psilon* (ε), and *o-micron* (ο); and from the semi-consonant *yod* (י) and *vau* (ו) the vowels *iota* (ι) and *u-psilon* (υ). From the original alphabet the Greek has omitted three characters: F (the digamma), derived from *vau* (ו), Q from *qoph* (ק), and ϡ (*san*) from *tsadde* (צ); and added five, H from *cheth* (ח), Ω (*o-mega*) from *o-micron* (ο); Φ differentiated from Θ, X from K, and Ψ probably from Φ. By the middle of the sixth century B.C. the Greek lapidary alphabet (as known from inscriptions) had assumed a definite form, to be replaced some three centuries later by the rounded capitals now in use, a cursive form being employed for correspondence. The small letters used in printing Greek books date from about the eighth century A.D., and were developed from a combination of the round capitals and the cursive forms.

Probably about the ninth century B.C. the alphabet was carried from Greece to Italy, where it was adopted by the Oscans, the Umbrians, the Etruscans, the Faliscans, and the Latins. As Rome grew in power the Latin alphabet gradually displaced those of the other Italian races; it became the alphabet of the Empire and its dependencies, spread over Western Europe, and has been carried far and wide by colonists till it has become the most widely used alphabet of the world, its only rival being the Arabic. The Latins retained as a mere breathing H, which the Greeks had made a vowel, and the letters F and Q, which they had discarded. Y was added about the time of Cicero to express the sound of the Greek Υ, and Z soon afterwards to write loan-words from the Greek. In the time of the early Empire the Romans used two forms of letters: capitals for inscriptions, from which our own capitals have been developed; and cursive forms for business and correspondence (chiefly known to us from the scribblings, technically called *graffiti*, on the walls of the houses of Pompeii), which were the origin of our small letters. From these cursive forms were also developed the semi-uncial script used by Irish monks in transcribing manuscripts, introduced by Alcuin into the School of Charlemagne at Tours, and afterwards known as Caroline minuscules. From an early form of this script was developed the Roman type, while a later and debased form gave rise to the Gothic or black letter.

The alphabet of the early Britons was a modification of the Roman, and the parent of that used in writing and printing the old Irish language. This alphabet, with some changes, was adopted by our English forefathers when they conquered the country. The symbols Þ þ (called the thorn-letter) and Ð ð (sometimes called *eth*) were used indifferently for the *th* in *thigh* and the *th* in *thy*, though sometimes they were differentiated; the rune ƿ (wén) was used for *w*, and *æ* for the sound of *a* in *fat*. Modern English has discarded these four symbols, though one of them (þ) is used unconsciously by those who write and print "yᵉ" for "the." The vowel-sounds, which were numerous, were expressed by the use of an accent (′) for long vowels, and by combinations of vowels. *U* was originally used both as a vowel and as a consonant, the latter being distinguished chiefly by its occurrence between two vowels, of which the latter is generally *e*. They were differentiated before the end of the thirteenth century, but the practice of writing *u* for the consonant sound always between two vowels, and the rule that *v* must never end a word, have given rise to such anomalies in our pronunciation as *shāve* (where *v* represents a primitive *f*) and *hāve*; *alīve* and *līve*, etc. About the same time the symbol ȝ was used for initial *y* or guttural *h* or *gh* when medial, but it went out of use in the fifteenth century, chiefly because it was indistinguishable from *Ȝ*, then introduced from the French, and used as in Latin to spell foreign words. About the same time the symbol *J* arose from the practice (still used in prescriptions) of writing the numbers *ii*, *viii*, *xii*, with a flourish of the final *i* thus: *ij*, *viij*, *xij*. But *J* was not generally used till the seventeenth century; it does not appear in the Shakespeare of 1623, though it was common in 1660. The dot over the *i* is a survival of an accent formerly added when that letter was written next to *m*, *n*, or *u*. The *wén* rune disappeared about the end of the thirteenth century, and was replaced by two joined *v's*, and afterwards by *w* (a French symbol), without any change in the pronunciation.

Alpheus (Rom. *Alphēus*), a river of Peloponnesus famed in classic song. Rising in Arcadia, and passing through Elis and Achaia, it falls into the Ionian Sea; but as part of its course is subterranean, strange legends and myths attached themselves to this phenomenon. The stream was personified as:

> "Divine Alphēus, who by secret sluice
> Stole under seas to meet his Arethuse."
> MILTON, *Arcades*, 30.

Arethusa, a nymph, having in vain been transformed by Diana into a Sicilian spring so as to escape the pursuit of her lover.

Alpine Club, an association consisting of English gentlemen, which was formed in 1857–8 for the purpose of creating a bond of union between those who found pleasure in mountaineering. It was the Alps that at first attracted the attention of the mountaineers, and hence the name of the club, but the members have by no means contented themselves with the peaks of Switzerland and Italy. Undoubtedly great good has been done by the members of the Alpine Club, both in revealing to the public many previously unheard of and unimagined beauties, and in pointing out at the same time the attendant dangers of the art of mountaineering, and suggesting the necessary precautions. It is, moreover, a significant fact that since the foundation of the club the death-rate of accidents from mountain climbing has been reduced to a fraction of the previous mortality.

Alpine Plants, low-growing perennial herbs, or wiry undershrubs, many of which are remarkable for relatively large and showy flowers, natives of the upland pastures of the Alps, Pyrenees, or other mountain ranges. Their flowers often melt their way through the snow, and many of them are pollinated by butterflies, a group of insects reaching high altitudes. In cultivation these plants require protection from drought, direct sunlight, and often from frost, being accustomed to the protection of snow. They include many species of *Ranunculus, Potentilla, Saxifraga, Hieracium, Campanula, Gentiana, Primula, Dianthus,* etc.

Alpnach, a small Swiss town at the foot of Mount Pilatus, on an inlet of the Lake of Lucerne, Switzerland. To convey timber from the mountain to the water "the Slide of Alpnach" was constructed, an inclined plane 8 miles long.

Alps, the name applied to the most important mountain chain in Europe. Physically the Alps cannot be separated from the Apennines on the one hand, from the mountains of Istria, etc., on the other. Thus, the limits of the chain itself, as well as its subdivisions, are rather arbitrary. It may be roughly separated from the Apennines by a line joining Turin with Mentone; from the Julian Alps by the watershed between the Isonzo and the Save. The chain sweeps round the great plain of northern Italy, by the head of the Adriatic, to the plain of Hungary, and it inosculates with the mountain region on the eastern shore of the Adriatic; the length measured along the watershed being roughly 790 miles, with a maximum breadth of about 200 miles. The highest peak is Mont Blanc (15,781 ft.), but many peaks exceed 10,000 ft., even the crest of a range not falling below this for a considerable distance. Thus, there are many large snowfields and glaciers. The Alps occupy part of the territory of the following nationalities: Austria, Bavaria, Switzerland, France, and Italy.

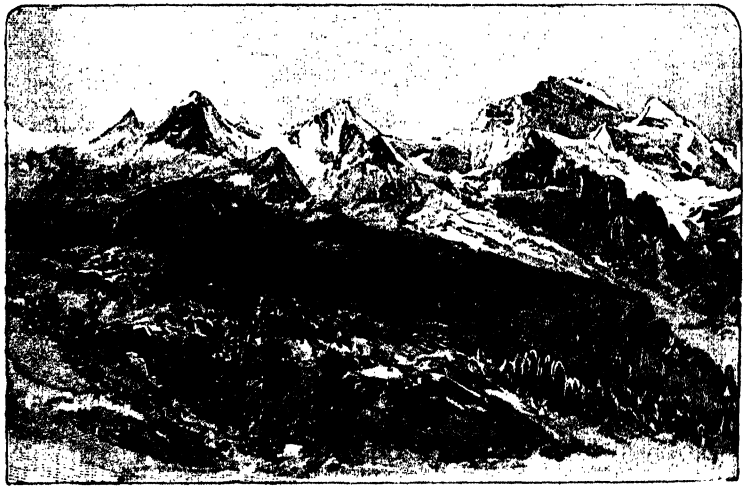
SUBDIVISIONS.—Geographers differ as to the subdivisions of the Alps: the following correspond nearly with those adopted by one of the best authorities.

(1) *The Maritime Alps.* These are divided from the Apennines, as stated above, and extend to the Col de Longet, south-east of the Viso. The chain here is single, with ramifying valleys, the highest peak being the Aiguille de Chambeyron (11,155 ft.). (2) *The Cottian Alps.* From the Col de Longet to the Col del Carro (joining the valley of the Arc in Savoy with that of the Orco in Piedmont), and limited on the west by the Col de Galibier. The chain is now becoming more complicated in structure. The highest peak in the Cottian Alps is Monte Viso (12,643 ft.). The most important road passes are the Mont Genèvre (6,102 ft.), and the Mont Cenis (6,772 ft.); near the latter a railway is carried through the range by a tunnel eight miles long. (3) *The Dauphiné Alps.* These are composed of a great spur extending westward from the main range (arbitrarily limited at the Col de Galibier, connecting the upper waters of the Durance with those of the Arc), and a huge offshoot from it towards the south, linked on by the Col du Lautarat (6,740 ft.), which is crossed by the carriage road from Grenoble to Briançon. In the former section only one peak just overtops 11,500 ft., in the latter the Pointe des Ecrins is 13,462 ft., and several exceed 12,000 ft. The structure of the chain is now becoming yet more complicated, and gives indications of being composed of parallel ranges. (4) *The Graian Alps* include the whole chain as far as the Little St. Bernard Pass (about 7,200 ft.), together with the great spur which runs out eastward and is cut off from the Pennine Alps by the valley of the Dora Baltea. Its highest peak is the Grand Paradis (13,300 ft.), that of the main mass is the Grande Casse (12,780 ft.). (5) *The Pennine Alps.* To these may be assigned the district north of the Graians, and on the left bank of the Rhone, though by some the western part of this is distinguished as the Savoy Alps, the eastern limit being the Simplon Pass (6,595 ft.). This division includes the most elevated part of the chain, from Mont Blanc, with its Aiguilles (or adjacent peaks) on the west, to the group of great peaks around Monte Rosa (15,217 ft.) on the east. Up to the Simplon no carriage road crosses the main range, but the Great St. Bernard, a mule track (8,131 ft.), has been made famous by its hospice. (6) *The Bernese Alps* run parallel with the Pennines from the valley of the Rhone to that of the Reuss. The range is generally lofty, the highest summit being the Finster Aarhorn (14,026 ft.); one of its glaciers, the Gross Aletsch, is the largest in the Alps. This range is continued east of the Reuss by the (7) *North Swiss Alps,* an extensive but less elevated region, the highest peak, the Tödi, only attaining 11,887 ft. In like way the Pennine Range is continued east of the Simplon Pass by the (8) *Lepontine Alps,* of which the Splügen Pass (6,945 ft.) may be taken as the eastern boundary. Here the peaks are lower, the highest point, Monte Leone (11,696 ft.), being close to the Simplon road. The range is crossed by the St. Gothard Pass (6,936 ft.), and pierced by a railway which passes through a tunnel 9½ miles long.

(9) *The Rhætian Alps* include the district east of the last up to the Vorarlberg Pass (now crossed by a railway) on the north; on the eastern side they are limited by the Inn as far as a line joining that river with the head waters of the Adige, and then by the right bank of that river. The highest peak is the Bernina (13,294 ft.). In this division is the Stelvio Pass, the highest carriage road in the Alps (9,177 ft.). (10) *The Vindelican Alps* include the northern range from the Lake of Constance to the neighbourhood of Vienna, the highest peak being the Zug Spitz (9,716 ft.). By some the part east of the Inn is called the North Noric Alps. (11) *The Central Tyrol Alps.* These are limited by the right bank of the upper Inn, and extend eastward as far as a rather irregular line passing through Gmund and Villach, the highest peak being the Gross Glockner, 12,455 ft. They are crossed by the Brenner Pass (4,588 ft.) road and railway; east of these are (12) *The Styrian Alps.* (13) *The South Tyrol* and *Venetian Alps* extend from the east bank of the Adige to the Sexten Thal, the highest peak being the Marmolata (11,020 ft.), and are followed by (14) *The South-eastern Alps.*

In the eastern part of the Alps the chain is obviously composed of three ranges, parted by long troughs occupied by important rivers, the central one being the watershed. This structure becomes rather less distinct near the head waters of the Inn, and the watershed appears to cross to the southern range. It is, however, more probable that the latter disappears by denudation, and the Lepontine and Pennine Alps are orographically continuous with the Central Tyrol Alps. South of Mont Blanc the above-named structure exists, but is difficult to trace.

Geology.—The "foundation stones" of the Alps consist of crystalline rocks—granites, gneisses, schists, etc., of unknown but very great geological age. The oldest fossiliferous rocks are of SILURIAN and DEVONIAN age; they occur in the Eastern Alps, between the Northern and Central range. Rocks of CARBONIFEROUS age are recognised here and there in many parts of the Alps. These prove that a region hilly, if not mountainous, then existed. PERMIAN times saw great volcanic activity in the South Tyrol region. After this came subsidence, and here extensive masses of dolomite were formed. In some districts land remained above water till the end of the TRIAS, but at last the whole area became submerged, and continued to receive sediment till near the end of the EOCENE period. Then began a great epoch of mountain-making.



THE BERNESE ALPS FROM THE WENGERN ALP.

The crust of the earth was folded, outlining the dominant features of the chain. Rivers, precursors of those still running, brought down sand and gravel and poured it over the lowlands or into the sea on either side of the chain. The MIOCENE period, roughly speaking, was closed by another epoch of mountain-making. This, in Switzerland, raised the pebble-beds in the Rigi and the Speer some 6,000 ft. above the sea. It left the chain much as it is at present, though vast masses of rock have been since removed. After a long interval, the climate of Europe, from some unknown causes, became much colder, the glaciers of the Alps increased enormously in size; they occupied the mountain valleys, debouched on the Italian plain, covered the lowland of Switzerland, and welled up on the flanks of the Jura to a height of about 2,000 ft. above the lake of Neufchatel. Here blocks of Alpine rocks remain to mark their limit. On the Italian plain the moraines (q.v.) are like ranges of hills. Some geologists have credited glaciers with the excavation of the lake basins; these, however, are regarded by others

as due to differential movements in the beds of pre-existing valleys.

The earth-movements have left their mark in extraordinary flexures of the rocks, beds being bent into S-like curves or even folded back. Sometimes these folds are fractured and one part is thrust over another; thus the order of succession is locally inverted. By pressure, clays have been converted into slates, massive crystalline rocks have become foliated, while ancient foliated rocks have received a new structure.

Hydrography.—The main rivers, the Mur, the Save and the Drave, draining the eastern part of the chain, run east towards the Danube, but the Salza, also its tributary, turns to the north and cuts through the northern range. The south face of the southern range is drained by minor rivers flowing to the head of the Adriatic, the most important being the Piave. Farther west the drainage of the south side of the central range is carried through the southern range by the Adige or Etsch, its principal affluents being parted from the Drave on the east and the Inn on the west by comparatively low watersheds. The last river rises in the southern range on the Maloya Pass (5,942 ft.), seemingly cuts the central range; then, after flowing eastward between this and the northern range, severs the latter and debouches on the Bavarian plain on its way to the Danube.

The central portion of the Alps is drained by the Rhine, the Reuss (its tributary), and the Rhone. These rise in the northern face of the Lepontine Alps; the first runs for a considerable distance eastward, the third in like manner westward, till they turn northward, and run roughly parallel with the second. Hence the head waters of these three rivers lie in a kind of trough interrupted by the Oberalp Pass between the Rhine and the Reuss, and the Furka Pass between the Reuss and the Rhone. The Aar is fed by the glaciers of the Bernese Alps, the Limmat issues from the North Swiss Alps.

South of Mont Blanc the Isère, Arc, and Romanche carry the drainage of the western portion of the chain, by zigzagging courses, to the Rhone; but parts of the Dauphiné and the Cottian Alps are drained by the Durance, which also ultimately reaches the Rhone. Parts of the Maritime Alps discharge their waters direct to the Gulf of Lyons by less important streams. West of the Adige, all the water from the inner side of the great loop of the Alpine chain makes its way to the Po.

Lakes.—The lakes of the Alps are numerous. The most important are those of the Salzkammergut and the Königsee in the North Noric Alps, the Lakes of Constance, Zurich, Lucerne, Thun, Brienz, and Geneva, wholly or in part, in Switzerland; of Garda, Iseo, Como, Lugano, Maggiore, mainly in Italy, with those of Annecy and Bourget in France.

Climate.—As the Alps extend over about four degrees of latitude and the summits vary so much in elevation, no general statement can be made. The mean temperature of the Swiss Lowland differs but little from that of England, the summer being rather warmer, the winter rather colder. The mean at Berne is 49·9° F., Lucerne 47·5°, Geneva 49·5°, Montreux 50·9°, the summer temperature at Berne being 72° and the winter 31·8°. The mean temperature at the St. Bernard is 28·12°. The rainfall here is 6·6 ft. per annum. The snow-line varies according to locality; 8,000 feet may be taken as a rough average. Much snow falls everywhere in the winter months. This slips from the great slopes of the mountains in the form of *avalanches*, which often are very destructive. Occasionally also portions of the steeper glaciers break away. The scenery of the Alps is varied and beautiful. In the more distant views lakes, pasturage, and woodlands form a foreground to snowy masses; in the heart of the ranges the traveller is surrounded by pine-clad slopes, grand precipices, rushing torrents, great glaciers, and snow-clad peaks. The Italian lakes are exceptionally lovely. The grandest outlooks over crag, snowfield, and glacier are to be obtained on the range of Mont Blanc, in the region about Monte Rosa, and in the Bernese Oberland. In the less frequented regions the Aiguilles of Dauphiné and the dolomite crags of the S.E. Tyrol are remarkably fine. But to appreciate the scenery of the Upper Alps their fastnesses must be scaled. This of late years has become a favourite pastime, so that the Alps have been called "The playground of Europe." Now not a peak of importance is untrodden, and the glacier plains which have been traversed may be counted by hundreds.

Fauna.—The fauna of the Alps obviously depends on the climate. In the lower parts it is that of Central Europe; higher up the wolf, lynx, and bear are occasionally found, with the hare (*Lepus variabilis*); the marmot is common near the edge of the snows, the chamois is not seldom seen among the higher peaks, the steinbock (*Capra Ibex*) is rare and appears to be now restricted to the Eastern Graians. The most distinctive Alpine birds are the lämmergeyer (*Gypaetus barbatus*), the brown eagle, the ptarmigan, the Alpine chough, and the Alpine swift. Reptiles do not ascend very high. Butterflies of mountain species are common, and have been seen fluttering about peaks more than 12,000 ft. high. Higher than about 3,500 ft. to 5,500 ft. (according to the locality) corn is seldom cultivated; the slopes are occupied by pastures or great pine woods to between 6,000 and 7,000 feet, and the former extend yet higher. These pastures afford ample food in summer to cattle, sheep, and goats, the animals and their attendants being sheltered in huts of wood or stone, called châlets.

Alpujarras or ALPUXARRAS, a branch of the Sierra Nevada range in the province of Granada, Spain. The mountains reach a height of 7,000 feet and are divided by rich and lovely valleys. After the reconquest of Spain the Saracens for some years found a shelter in this district.

Alsace-Lorraine (*Elsass-Lothringen*), a province of the German Empire, made up of the two French provinces, which, with the exception of the district of Belfort, were ceded to Germany after the war of 1870-71. *Alsace*, originally part of the Frankish kingdom of Austrasia, had been incorporated in the German Empire in the 10th century, and was gradually united to France by the treaties

of Nimeguen, Ratisbon, and Ryswick (1697). It then formed the departments of Haut and Bas Rhin. The inhabitants, though Teutonic by blood and speech, became more French than the French, and in 1871, when the Germans reoccupied the territory, 45,000 of them passed over into France. The chief town is Strasburg. *Lorraine* first became a kingdom about 855 under Lothair, from whom the name is derived. After it had several times changed hands between France and Germany, the Emperor Otho, in 959, divided it into two duchies. Basse Lorraine passed into Brabant, but Haute Lorraine, the larger portion, was for seven centuries governed by hereditary dukes, and proved a perpetual bone of contention between the greater powers until in 1737 it was bestowed for life on Stanislas, the dethroned King of Poland. On his decease it became part of France, and with additions made up four departments—Moselle, Meurthe, Meuse, and Vosges. Nancy is the chief town of the section retained by France in 1871, and Metz is the capital of the ceded moiety. The united German province has an area of 5,580 square miles. It lies wholly to the west of the Rhine, and, though mountainous in certain districts, is one of the most fertile regions in Central Europe, besides possessing valuable industries and rich mines. The government is conducted by a *Statthalter* appointed by the Emperor, Strasburg being his residence. Mülhausen is the seat of the great spinning and weaving manufactures. Metz and Thionville are strong fortresses. Altkirch, Colmar, Saarburg, and Mezières are towns of importance.

Alsatia, the term applied in the seventeenth century to Whitefriars, which at that time was a debtors' sanctuary, and consequently became the abode of many very questionable characters. (See Scott's *Fortunes of Nigel.*)

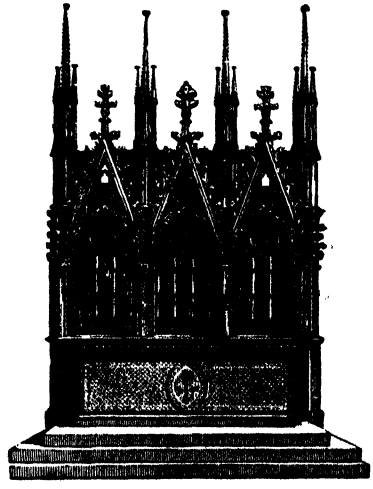
Alsen, an island in the Little Belt, closely adjacent to the coast of Schleswig. Until 1864 it belonged to Denmark, but in the Prusso-Danish War it was made part of the German province of Schleswig-Holstein. It is 20 miles long, and varies in breadth from 3 to 12 miles. Sonderburg, the capital, possesses an excellent harbour.

Alster, a tributary that flows from Holstein on the N. into the Elbe close to Hamburg. Here it forms a lake which is called the Great or Outer Alster until it enters the town, when it is known as the Inner Alster.

Altai Mountains (Chin. *Ghin-Shan*, Gold Mountains), one of the greatest mountain systems of Asia, stretching 5,000 miles from long. 85° E. to the Sea of Okhotsk, and separating the Russian Empire from that of China. The collateral branches cover a breadth in some parts of 800 to 900 miles. The average height does not exceed 5,000 feet, but the Russian Altai reaches 12,000. The mountains consist of rounded granite masses with no peaks or jagged crests. The rivers Obi, Irtish, and Yenesei have their sources in these ranges, the mineral wealth of which is probably enormous. Gold, silver, copper, iron, lead, and various kinds of gems abound in them. Forests of hardy trees clothe the lower slopes, and the wild sheep has its home here. The Altai proper is the portion of the system within the province of Tomsk, Siberia. The main ridge is the Sailughem, which as it extends south-west is known as the West Sajan. The fertile valleys to the south are being rapidly colonised; the chief town is Barnaul.

Altamura, a town in the province of Terra di Bari, S. Italy, close to the foot of the Apennines. It was built by the Emperor Frederic II. on the site of the ancient Lupatia. There is a handsome cathedral.

Altar (from the Latin *altus*, high), an erection made for sacrificial purposes, or for some other object. Altars were used by the ancient Greeks



ALTAR.
(*From the Church of St. Elizabeth, Marburg.*)

and Romans, and varied in size, shape, and material. Almost all nations have, at some period, made use of altars, the Mohammedans being an exception. In the early Christian churches for more than five centuries altars were of wood; stone was then introduced. A good example of the Gothic altar is given above. In the Romish Church the altar is of much importance. Strictly speaking, indeed, there is no altar in the English Church, what is generally known as the altar being "the holy table." In 1845 the Court of Arches decided that no altar might be erected in a church. During the early years of the twentieth century, a Mr. John Kensit gathered a body of young men round him, and in many parts of England carried out an aggressive propaganda against such Ritualistic churches as he considered had infringed this ruling. Many riots resulted from his activities.

Altazimuth, an astronomical instrument for observing the position of a heavenly body. It consists of a telescope capable of adjustment to view any point in the celestial hemisphere, and arranged with a vertical graduated circle to observe its altitude, *i.e.* its angle with the horizontal, and with a

horizontal circle to show its azimuth, *i.e.* its declination from the north and south line.

Altdorfer, ALBERT, a Bavarian painter and engraver, born at Altdorf, 1488, died at Regensburg, 1538. He is regarded as the best of Albert Dürer's pupils, and one of his masterpieces, *The Battle of Arbela*, is in the Pinacothek at Munich.

Alten, KARL AUGUST, son of a Hanoverian Baron, born 1763. In 1803 he entered the British service, and during the Peninsular War he distinguished himself highly at Albuera, Salamanca, the frontier engagements, and Toulouse. He commanded a division at Waterloo, and fought admirably at Quatre Bras. He returned to Hanover, became Minister of War, and died in 1840.

Altenburg, the capital of the duchy of Saxe-Altenburg, Germany, 24 miles south of Leipsic. It is an ancient but well-built town, with a cathedral, palace, picture-gallery, school of art, library, gymnasium, etc. A large trade is done in grain, cattle, horses, and books.

Altenburg, THE DUCHY OF SAXE-ALTENBURG, situated between the kingdoms of Prussia and Saxony, the principalities of Reuss, Schwartzburg, and Coburg, and the grand duchy of Weimar, held by a branch of the Saxe-Gotha family until 1825, when it became incorporated in the German Confederation, and subsequently in the empire.

Altengaard, a seaport in Finmarken, Norway, 53 miles from Hammerfest, lat. 69° 57′ N. It has a considerable trade, and is the farthest point north at which grain can be cultivated. A meteorological and magnetic observatory is established here.

Alteratives, drugs whose manner of action is obscure, but which are of considerable use under certain appropriate conditions in effecting improvement of nutrition. Among such are cod-liver oil, arsenic, mercury, and the iodides.

Alternation of Generations. In most cases the progeny of an animal resembles in structure that of the parent. But with many of the lower animals and plants, the parent is succeeded by one or more generations totally unlike itself, and from these are produced the original parent form. Thus, the plant-like colony of a ZOOPHYTE such as CAMPANULARIA produces buds which are detached from the parent, and swim about as JELLY-FISH; these produce embryos which ultimately grow into the plant-like colonies of the first generation. The experiments of Mendel in 1865 in the hybridisation of plants proved that interfertilisation resulted in types akin to each parent and also combining characteristics of both. Instances of A. are also found among the APHIDES, BARNACLES, TAPE-WORMS, MOSSES, FERNS, etc.

Alto, in *music*, the name given to the highest male voice, and also to the lowest female voice, more properly called contralto. The tenor violin (q.v.) is known in Italian as the *alto viola*.

Alton, a market town in Hampshire, on the river Wey, and 16 miles from Winchester on the L. and S. W. Railway. It has a fine old church. There are ironworks, paper factories, and breweries.

Altona, a town and port of Germany, on the right bank of the Elbe. It is so closely connected with Hamburg as to be almost a suburb of that city, though it is in Schleswig-Holstein, a different province. The town is handsome and prosperous, having been founded for 200 years, and fostered by the Danes as a rival to the neighbouring port. After the war of 1864 the Germans took possession of it. The imports and exports are considerable, nor are manufactures wanting, such as sugar, starch, velvet, silk, cotton stuffs, tobacco, etc. A railway connects Altona with Kiel.

Altoona, a town in Blair county, Pennsylvania, U.S.A., at the foot of the Alleghanies. Works for locomotives are established here in connection with the Pennsylvania Central Railway.

Alto relievo, or RILIEVO, sculptured work in which the designs project from the background more than half their proportion, yet are not wholly detached.

Altorf, or ALTDORF, as the name indicates, an ancient town, the capital of the Canton of Uri, near the south end of the Lake of Lucerne. It is the starting-point of the road over the St. Gothard Pass, and, until the railway was made, this position gave it no little business and importance. There is a very large statue of Tell in the market-place.

Altrincham, a market town in Cheshire, 8 miles from Manchester, on the Manchester and Altrincham Railway, and the Bridgewater Canal. Cloths, cottons, yarns, and chemical manures are made here, and many market gardens supply Manchester with vegetables. (Pop. 1901, 16,831.)

Altruism, a term opposed to egoism, first used by Comte, and adopted by Herbert Spencer, signifying love of others or devotion to others.

Aludel, earthen vessels, similar in form to the ordinary pear-shaped lamp chimneys, which are joined together in series for the condensation of vapours which issue from retorts. They are especially useful in the extraction of mercury from its ore.

Alum, in its general sense a double salt produced by the combination of the sulphate of an alkali metal with the sulphate of a triatomic metal of the aluminium group. As a class the alums are marked by identity of crystalline form, ready solubility in water, astringent taste, and acid reaction. They also contain the same quantity of water of crystallisation. The term *alum*, in its special sense, invariably denotes ordinary potash alum, symbol $K_2So_4Al_2(So_4)_3.24Aq.$

Alumbagh, a garden or park surrounding a palace and a mosque, 4 miles from Lucknow, in the province of Oude, British India. It was the property of the Princes of Oude, and in 1857 was occupied by the mutineers, who were dislodged by Outram, Havelock, and Neill. The British garrison held the place against overwhelming odds until relieved by Colin Campbell, in 1858. The Alumbagh then became of material service to our forces in operating against Lucknow and the local chiefs

Alumina, or *Oxide of Aluminium*, Al_2O_3. Many precious stones, as *sapphire*, *ruby*, *amethyst*, etc., consist of practically pure alumina in a crystalline state. Crystalline alumina is, next to the diamond, the hardest of all known substances. Alumina, as prepared by a process of precipitation, forms a white, amorphous powder, which has a great affinity for colouring matters, combining with them to form *lakes* (q.v.). It is hence of great importance in dyeing and colour-manufacture.

Aluminium, a metal which does not occur in nature in the free state, but for the most part in combination with silica, as a silicate of aluminium, in clay and many minerals. As extracted from clay by a series of very difficult chemical operations, it forms a white metal, very ductile and malleable, and susceptible of a high polish. S.G. 2·6, M.P. 700° C., At. Wt. 27. On account of its lightness aluminium is highly valued; it forms excellent alloys. The frameworks of all the "Zeppelin" airships are made of an aluminium alloy. It undoubtedly has a great future.

Alured, or ALFRED, an English chronicler of the 12th century, who was canon and treasurer of the Church of St. John, Beverley, Yorkshire. He wrote a summary of the events of English history from fabulous times to 1129 A.D., when he is supposed to have died.

Alva, or ALBA, FERDINAND ALVAREZ DE TOLEDO, Duke of, the Spanish prime minister and general, under Charles V. and Philip II., born in 1508. His great military abilities first displayed themselves in 1547, when he defeated the Elector of Saxony at Mühlberg. He fought with great skill and courage against the French in Lorraine, though he failed to take Metz, and in 1556 he completely crushed the Papal forces in Italy. Ten years later he was appointed Viceroy in the Netherlands for the purpose of reducing that country to submission. His rule was marked by unparalleled barbarity, but by undoubted military talent. The Counts Egmont and Horn were the most illustrious of his victims, but he is said to have boasted of having put to death 18,000 persons judicially, apart from those slain in war. In 1573 he was recalled, and lived for some time in disgrace through the conduct of his son, but in 1581 his services were required against Portugal, where he succeeded in driving Don Antonio from the throne. He died in 1582. His actions and character will be found ably described in Motley's *Rise of the Dutch Republic*.

Alvarado, a large river that flows into the Gulf of Mexico, 36 miles from Vera Cruz. The port at its mouth bears the same name.

Alvarado, ALFONSO D', a companion of Pizarro, and for some time Captain-General of Peru. He opposed Almagro, and pursued the murderers of his chief. His death took place in 1553.

Alvarado, PEDRO D', a Spanish adventurer, born in 1495, accompanied Cortes to Mexico in 1518, and fought valiantly until that kingdom was conquered. He then became governor of Guatemala and Honduras, and reduced those provinces to order. He was killed by the fall of his horse in a skirmish with Indians in 1541.

Alvarez, FRANCESCO, a Portuguese ecclesiastic, born about 1460. He was almoner to King Emmanuel, and was sent by him with Rodrigo de Lima on a mission to David, King of Ethiopia and Abyssinia, 1515. After a detention of six years in that country he returned, *viâ* India, and wrote the first description of it that appeared in Europe. He died about 1540.

Alvarez, DON JOSÉ, an able Spanish sculptor, born in 1768. He became court sculptor to Ferdinand VII., lived principally at Rome, and died in 1827. His masterpiece is a group representing Memnon and Antilochus.

Alwur, or ULWAR, a state and its capital town in Rajpootana, under the control of the British Agent at Ajmeer. The state is on the E. frontier of Rajpootana, and not far from the river Jumna. It is 80 miles from north to south, and 60 miles in breadth. The town is poorly built and enclosed within a mud wall.

Amadavat, or AVADAVAT (*Estrelda amandava*), the Red Waxbill, a finch common throughout India, named from Ahmadabad, whence they were formerly imported into Europe in great numbers. General plumage of female olive-brown; that of the male in summer is more or less crimson, but after the breeding season he assumes the dusky plumage of his mate. The males are valued for their song, and the natives train them to fight like gamecocks.

Amadeus, the names of several counts and dukes of Savoy from whom sprang the kings of Sardinia and the present sovereign of Italy. The most eminent of this line was AMADEUS VIII., who succeeded to his father in 1391. He considerably increased his dominions, and was created duke by the Emperor Sigismund in 1416. In 1434 he retired into a monastery. Five years later he was put forward by the Council of Basle as successor in the Papal chair to the deposed Eugenius IV. He assumed the title of Felix V., but was not recognised by the Church. He died in 1451.

Amadis of Gaul, known as 'The Knight of the Lion," a legendary hero of chivalry, who plays the same part in the romantic history of Spain as Arthur in that of England and Charlemagne in that of France. He was said to be the son of Périon, an imaginary French king. Esplandian was his son, and Florisando his nephew. It is impossible to assign a date to his career, which is, perhaps, a mere reflection of the myth of Arthur. His story was first told in Spanish literary prose by Garci Ordonnez de Montalvo, a Portuguese, towards the beginning of the 15th century, and the scene is laid in Scotland. Lobeira is generally regarded as being the author of the four books containing the original narrative, but they have been assigned to Cervantes. Nine other books in Spanish were soon added, and eleven more in French carried on the tale. The exploits of many other personages bearing the same name are recounted in these supplementary pages, and throughout the Middle Ages

Amadis supplied a theme for imaginative writers. Southey published a condensed translation of the early romance.

Amadou, or GERMAN TINDER, consists of slices of the fungi *Polyporus fomentarius* and *P. igniarius*, beaten out with mallets, and used as a styptic, for warm underclothing, or, after being boiled in a solution of saltpetre, as tinder.

Amalekites, a race, of warlike, aggressive propensities, who much harassed the Israelites in their passage into Canaan. They dwelt in the peninsula of Sinai, between Palestine and Egypt, and were exterminated by Saul and David.

Amalfi, a port on the N. side of the Gulf of Salerno, Italy. In the 9th century it was an independent republic, governed by its own doges, and a place of great commercial importance. The inhabitants joined warmly in the Crusades, and founded a hospital at Jerusalem, which gave rise to the order of the Knights of Malta. In 1135 the town was sacked by the Pisans, and soon after was annexed to the kingdom of Naples. The maritime code of Amalfi was highly esteemed in the Middle Ages, and a celebrated manuscript of the Pandects was discovered there. The place is now unimportant save as the seat of an archbishopric, and as manufacturing macaroni, silk, and paper.

Amalgam, an alloy formed by the combination of mercury with another metal.

Amalia, ANNA, the wife of the Duke of Saxe-Weimar, who, losing her husband early, acted as regent for her son during some twenty years with much ability. Her court was the rendezvous of such illustrious men as Goethe, Schiller, Herder, and Wieland. Heartbroken at the issue of the battle of Jena, she died in 1807.

Amaltheidæ, one of the most important families of the AMMONITES. It occurs in the geological systems of which the Oolites and the chalk are the best known rocks.

Amanita, one of the sub-genera of *Agaricus*, characterised by having white spores and an outer covering or *volva* (*velum universale*) which bursts, leaving a torn cup round the bulbous base of the stalk and flaky scales on the top (*pileus*) of the fungus, generally in addition to the inner veil (*velum partiale*) below the gills. *A. muscaria*, the Fly Agaric, used as a fly-poison, is bright scarlet with scattered white flakes on its pileus. Some species are edible.

AMARANTH. (*A. hypochondriacus.*)
(Prince of Wales'-feathers.

Amaranth, or more correctly AMARANT (*see* Milton's *Paradise Lost*, iii. 353), from the Greek *amarantos*, unwithering, is the name of a large order of weedy herbaceous plants, mostly growing in dry situations in the tropics, having a crowded inflorescence of florets with dry membranous floral leaves, often coloured, as in the familiar "cockscomb," "love-lies-bleeding," and "Prince-of-Wales'-feathers."

Amara-pura (*City of the Immortals*) is a town on the left bank of the Irawaddy, Burmah, between Ava S. and Mandalay N. It was founded in 1783, but suffered so severely from fire in 1810 and earthquake in 1839 that the population is now insignificant, and little remains of the city but ruins.

Amara, SINHA, a Hindoo poet and grammarian, who flourished about 50 B.C. His works have perished with the exception of a Sanscrit grammar and vocabulary known as Amara-Kosha (*Treasury of Amara*).

Amari, MICHELE, an Italian author and revolutionary politician, born at Palermo, 1807. His father narrowly escaped death as a penalty for taking part in Carbonari movements, but the son adhered to progressive principles. In 1842 he produced a history of the war of the Sicilian Vespers, which gave such offence to the Government that he was compelled to seek refuge in France, where he became an Oriental scholar. At the outbreak of revolution in 1848 he returned and held office for a year, but on the breakdown of the constitution he again escaped to Paris and wrote a history of the Mussulmans in Sicily. In 1860 the expulsion of the Bourbons restored him once more to his native country, where he became Minister of Education and for a time of Foreign Affairs under Garibaldi. Many other distinctions were showered upon him, and in 1878 he presided over the Congress of Orientalists at Florence. He died in 1889.

Amaryllis, a genus of bulbous monocotyledonous plants, with petaloid perianth, six stamens bursting inwards, and an inferior ovary, which gives its name to the order *Amaryllidaceæ*. The group have their maximum development in South Africa. Many are cultivated for their large showy flowers. One of the best known is *A. Belladonna*, the so-called Belladonna lily, with beautiful pink flowers.

AMARYLLIS. (*A. Belladonna.*)
(Showing bulb and flower spike.)

Amasia or AMASIAYAH, a town of Asiatic Turkey, built on a hill overlooking the river Yeshil-Irmak. It was formerly the capital of the Kings of Pontus. It is a somewhat dirty old town, but contains a fine mosque erected by Bajazet II. (1490), a college founded also by him, a citadel standing on a commanding height, and many remains of antiquity. Silk, wine, wheat, and salt are its chief products.

Amasis, King of Egypt from 570 to 526 B.C. Originally the Prime Minister of Apries, he supplanted and killed his master. He appears to have exercised his usurped power with wisdom, effecting judicious reforms, encouraging intercourse with foreigners, and adorning the country with magnificent structures. He gave the Greeks the port of Naucratis in the Delta.

Amateur, one who follows any profession, science, art, or sport for its own sake, as opposed to one who follows it from pecuniary motives.

Amati, an Italian family celebrated in the 16th and 17th centuries for hereditary skill in the making of violins. They were established at Cremona, and thus their instruments share with others the name of Cremonas. [CREMONA.] There is some little difficulty in distinguishing between the members of the family. Andrea and his younger brother Nicolo are usually regarded as the first makers, and it is said that specimens of their work date back to 1551. Nicolo had two sons, Antonio and Hieronimo, whose products date from 1589 to 1627, and are the Cremonas that come into the market nowadays. The best instruments date from 1599 to 1620.

Amaurosis (from a Greek word meaning obscure), the term applied in past days to signify any form of blindness, the cause of which was unknown. The invention of the ophthalmoscope, however, by means of which the fundus or back of the eye can be critically scrutinised by the physician or surgeon, has led to great advances being made in our knowledge of the causes of blindness. There are, however, a few conditions in which the vision is very defective, and yet no abnormal appearance can be detected in the fundus of the eye. One of the commonest of these is met with in cases of squint due to hypermetropia (q.v.); again, in the night blindness of those who have been habitually exposed to strong light, and in some cases of sight-failure after railway accidents, little if any change can be detected with the ophthalmoscope. After exhausting illness, in anæmia, and in some forms of hysteria, a similar condition obtains. A curious form of amaurosis is that known as tobacco amaurosis or tobacco amblyopia [AMBLYOPIA], the characteristic feature of which is that the central part of the field of vision is the first to fail. This defect is not uncommonly associated with excessive smoking, but possibly other causes are at work as well, the subject being up to the present time in no very settled state. Finally, amaurosis is at times simulated by impostors. The vacant gaze of the patient who cannot see is very characteristic. The pupils are dilated, the eyes do not converge to fix near objects, but remain as though intent on something in the far distance. This condition is known as the "amaurotic stare." The treatment of amaurosis is unsatisfactory. In the hypermetropia much can be done if the condition has not advanced too far, and some of the tobacco cases improve under treatment when smoking is discontinued.

Amazon, or Amazonas, a vast stream formed in equatorial S. America by the confluence of many rivers, draining an area of some two and a half millions of square miles. The name Amazon applies strictly to the lower reaches, and is derived, not from the fabulous female warriors of the Classics, but from a native word, *amassona*, "boat destroyer," as the spring tides produce a dangerous "bore" near the mouth. The middle portion is known to the Portuguese as Rio dos Solimoens, or Orellana, from the explorer who first navigated it. The upper waters are called Marañon, that river disputing with the Ucalayi, or Upurimac, the claim of being the head-stream. The former has its rise in Lake Lauricocha, Peru, lat. 10° 30′ S., long. 76° 50′ W., and flowing down between the Andes and the E. Cordilleras, turns E. at about the fifth degree of S. latitude, receives the Ucalayi, that starts from near Cuzco, and continues its course of some 3,000 miles to the sea. Many huge tributaries fall into the central stream, such as the Purus (2,000 miles), the Madeira (1,500 miles), the Tapajos, and the Xingu, from the S., and the Napo (530 miles), the Japura, or Caquета (1,000 miles), the Negro (1,000 miles), and the Trombetas from the N. The mouth, which is traversed by the Equator, is 50 miles broad, but the delta with its islands extends for 200 miles. The influence of the tide (Pororoca) is felt 400 miles up the river, which is navigable for 2,000 miles. For most of its course it flows through dense forests (*selvas*), rich in various kinds of timber, but especially in the caoutchouc, or indiarubber tree. The waters abound in turtle, fish, and caimans, or alligators. The estuary was discovered by Pinçon in 1500, but Francis Orellana was the first to navigate the stream from the Rio Napo to the sea in 1540.

Amazons, a mythic race of female warriors, whose exploits form an important part of Greek mythology. They were said to inhabit the country round the Caucasus, and to have fixed their principal seats on the river Thermodon, in the neighbourhood of the modern Trebizond; and from this parent stock came two branches who settled respectively in Scythia and in Africa. They are described as hardy, courageous, indefatigable women, burning away their right breast so that they might be enabled to draw the bow freely, dwelling apart from men, and allowing themselves only a short temporary intercourse with their neighbours, the Gargareans, for the purpose of renewing their numbers, bringing up their daughters in their own peculiar fashion, and killing their sons or sending them back to the land of their fathers. The contest between the Greeks and the Amazons was said to have begun when Hercules invaded their country in the execution of his ninth labour. The hero was required by Eurystheus, King of the Argives, to bring him the baldric of Hippolyta, the Amazonian queen. According to some authorities, Theseus took part in this expedition, while others say that he led a distinct expedition at a later date, to avenge which the Amazons invaded Attica, passing round the Black Sea and crossing the Cimmerian Bosphorus (now the Strait of Yenikale) on the ice. They continued in Attica four months and fought several battles, but were at last routed

and driven out of Greece. Towards the end of the Trojan war they came to the assistance of Priam, led by their queen, Penthesilcia, who is said to have been slain by Achilles. The war with the Amazons was often treated by Greek sculptors and painters, and apparently formed the subject of the metope on the north side of the Parthenon (in fitting proximity to the sculptured representation of the struggle between the Centaurs and the Lapithæ), and certainly that of a relief in the Acropolis. The name of this mythic race was formerly said to be Greek, and to mean "breastless"; but in all probability this is a folk-etymology, invented to account for the myth, and the word is now believed

Amazons. (*From the Parthenon.*)

to have come from Africa, in which continent female warriors existed down to recent times; a band of female warriors being kept in Dahomey before its annexation by France. A masculine, pugnacious woman is now sometimes called an *Amazon*.

Amazon-stone, an apple-green variety of microcline (q.v.) (triclinic potash-felspar).

Ambassador. [Diplomacy, Envoy.]

Amber, Cape, the northern extremity of the Island of Madagascar (lat. 12° S., long. 49° 20′ E.).

Amber, a decayed city in the state of Jaipur, Rajputana, India. It has now but few inhabitants, and the fine palace is deserted.

Amber, a fossil resin produced by an extinct species of conifer (*Pinites succinifer*); occurs in all parts of the globe; in Europe is most plentiful in North Germany. S.G. 1·05 to 1·1; hardness, 2 to 2·5. Insoluble in water and alcohol; but soluble in fixed oils by the aid of heat, giving rise to the most durable varnish known. Amber becomes electric by friction; our word "electricity" (*ēlectron*, amber) being derived from this characteristic property.

Amberg, a fortified city of Bavaria, formerly the capital of the Upper Palatinate, built on both sides of the river Vitz. The houses are mostly of wood, but the streets are wide and clean. Besides the Gothic town hall, the fine Church of St. Martin, and the castle, Amberg boasts of its mint, its arsenal, and its hospital. Coal and iron are worked in the neighbourhood.

Ambergris, a waxy substance found near the coast in tropical seas, and probably derived from the intestines of the spermaceti whale, S.G. ·8 to ·9; M.P. 62° C.; soluble in ether and essential oils, also partially soluble in alcohol. Ambergris is valued for its perfume.

Ambleside, an old and beautifully placed town at the N. end of Windermere, Westmoreland. Its prosperity is principally due to the influx of tourists, but there are mills for woollen manufactures. The houses of Wordsworth, Dr. Arnold, and Miss Martineau are in the neighbourhood. (Pop. 1901, 2,586.)

Amblyopia, a condition allied to amaurosis, but differing from it in that vision is defective, but not absolutely lost.

Amblyopsis. [Blind-fish.]

Amblystoma, a genus of Salamanders, with twenty-one species, ranging from Canada and Oregon to Mexico, chiefly remarkable for the metamorphosis of its larval form Axolotl (q.v.).

Amboise (Lat. *Ambacia*), a town on the left bank of the Loire, in the department Indre et Loire, France. The ancient castle, now only used as a state prison, was once the residence of French

kings. Charles VIII. was born and died there. The Huguenot conspiracy of Amboise found its beginning and end on this spot (1560). A good trade is done in wine, and woollen and steel goods are manufactured.

Amboise, GEORGES D', best known as Cardinal d'Amboise, born at Chaumont, near Amboise, in 1460. At the early age of 14 he was appointed Bishop of Montauban by Louis XI., and subsequently became Archbishop of Narbonne, of Rouen, and Governor of Normandy. He attached himself to the Duke of Orleans, afterwards Louis XII., who made him Prime Minister in 1498. He kept down taxation, curbed judicial corruption, reformed the Church, and had the welfare of the nation at heart. Alexander VI. created him Cardinal and Papal Legate in France. It is believed he aspired to the tiara, and fomented schism to attain his ends. He died in 1510, leaving a vast fortune.

Amboyna, the chief, though not the largest of the Molucca or Spice Islands, in the Eastern Archipelago (lat. 3° 45′ S., long. 128° 15′ E.). It is 32 miles long by 5 or 6 broad, and has an area of 280 square miles. A narrow isthmus divides the island into two halves, Hittoo and Leitimor, the capital town, Amboyna, being in the latter. The country is hilly, but covered with vegetation. The cultivation of cloves forms the principal industry. In good years the crop reaches a million pounds in weight. Cinnamon, coffee, indigo, and sago are also grown. Discovered by the Portuguese in 1515, Amboyna was taken by the Dutch in 1605. The English took the island in 1706, and again in 1814, but restored it to Holland, to which country it now belongs.

Ambrose, SAINT, of Milan, one of the Fathers of the Latin Church, born 340 A.D. The son of a Prefect of Gaul, and himself holding similar office in Liguria and Emilia, he was, for his many good qualities, chosen Bishop of Milan in 374. He opposed the Arian heretics at the council of Aquileia, and he refused to allow the Emperor Theodosius to enter his church until he had done penance for a massacre at Thessalonica. Chanting was borrowed by him from the Pagan rites, and one of the recognised liturgies was his composition. The *Te Deum* has been by some ascribed to his authorship. He wrote several treatises, *e.g.* on the duties of priests, and on virginity, besides a letter to Valentinian against Symmachus, but his works are more remarkable for subtlety and fancy than for solid merit and good taste. He died in 397. The great library at Milan bears his name, and the Milanese church still employs the Ambrosian use or liturgy, which some hold to be the use upon which that of the English church is founded.

Ambrosia, a term used in Greek mythology to denote sometimes the food and sometimes the drink of the immortal gods. In Homer and the later writers the word is used for the food, and nectar for the drink of the dwellers on Olympus, but in Sappho and Alcman these meanings are reversed. Both ambrosia and nectar were fragrant, and are said to have been employed as perfumes and unguents.

Ambulance, properly, a kind of vehicle used for conveying sick or wounded persons to the hospital. The word is often used, however, to designate the medical establishment accompanying an army, or the work performed by such an establishment. The employment of *ambulances* was not introduced into the army until after the Crimean war, when it was recommended by a commission which was appointed in 1857, and which effected many improvements. In 1877 the St. John's Association was formed for the training of students outside the army. Lectures are given all over the country, and classes formed for instruction respecting "first-aid" to sufferers from accidents.

Ambuscade, *military*, the device of lying concealed with the view of surprising or suddenly attacking a foe. The ambuscade is seldom employed in modern warfare.

Ameer (sometimes spelt EMIR, AMIR), a title of nobility used in the East. The sovereign of Afghânistân is known as the Ameer.

Amen, a word of Hebrew origin, signifying *certainly, truly*. It is now used in the sense of "So be it," "May it be granted," at the end of prayers, imprecations, thanksgivings, etc.

Amende honorable, in old French law, a humiliating punishment inflicted on traitors, parricides, and other offenders. The term is now used in England of a public apology for any injury inflicted.

Amendment, in its legal signification, any correction or other alteration in the written or printed record of judicial proceedings. In early periods of English history the pleadings between the parties were conducted orally at the bar of the court by their respective advocates. If any mistake occurred it was at once corrected upon a suggestion made to the court. When this state of things ceased, and written pleadings came into use, the same indulgence as to amendments was continued, and the power to do this is now much extended under the Judicature and Court of Session Acts, and the practice consequently improved and simplified, both in England and Scotland. There is, however, in criminal proceedings, much less power as to amendments, and far greater strictness is observed in the practice. In the United States the alterations made in the constitution are termed "amendments." The Senate has power to amend money Bills passed by the House of Representatives, but cannot originate same. The term is also applicable to the Acts of the British Legislature, and implies any alteration in a Bill, question, or motion before the House of Lords or Commons. Notice of moving an amendment need not be given, although it usually is. The amendment must be relative to the motion or question before the House. Amendments are not usual at the first reading of a Bill. The term is lastly applicable to a proposal brought forward at a public meeting, modifying the original motion or proposition by the introduction of an alteration in same, or entirely overturning the

original motion. The opinion of the meeting is generally taken upon the amendments as they are successively made, and lastly upon the original motion or proposition. Amendments may be made so as totally to alter the nature and effect of the proposition, and this is a way of getting rid of a proposition, by making it bear a sense not intended by the movers, who are thus compelled to abandon it.

Amentaceæ (from the Latin *amentum*, a catkin), the name of a large natural order including most of the broad-leaved trees of the north temperate zone, such as willows, poplars, birches, alders, oaks, hazels, etc., in which the flowers are collected together in catkins.

Amentum. [CATKIN.]

Amercement, or AMERCIAMENT, a pecuniary penalty imposed on offenders by Courts of Justice, according to the nature of the offence and the authority of the court. The term had also another practical signification. The plaintiff in an action was originally required to appear in court by himself, solicitor, or counsel before the jury delivered their verdict, that he might be present to answer the "amercement," to which, by the old law, he was liable in case of failure, as a punishment for his false claim, that word signifying that he was "a mercie," at the mercy of the Crown as to the fine to be imposed. The amercement is disused, but an allusion to it may still be traced, for if the plaintiff does not appear no verdict is given, and the plaintiff is then said to be nonsuited, non sequitur clamorem suum. The difference between amercements and fines is that the latter are certain, and are created by some statute; they can only be imposed and assessed by Courts of Record. The former are arbitrarily imposed by courts not of record, as Courts Leet.

America, NORTH—UNITED STATES: *Geography.*—The United States contain over three million square miles of almost uniformly arable land, diversified by mountains, lakes, and rivers in great number, the Mississippi river with its tributaries representing in itself a water basin area of more than a million square miles.

The coast-line from Virginia to the Canadian border is indented with many excellent harbours, notably Portland in Maine; Newport in Rhode Island; New London in Connecticut; New York, and Newport News in Virginia, in which the largest ships enter with comfort. The ports of the Southern States are many, but as a rule difficult to enter, and of comparatively unsatisfactory accommodation. The Pacific coast has in San Francisco one of the best ports of the world, but very few others of consequence.

The mountain ranges that follow the Pacific coast-line may be said roughly to begin at Cape Horn, to reach through South America, Central America, and Mexico, and after crossing the United States along its western border, to continue through Canada, not ending until they lose themselves in the unexplored recesses of the Arctic. Between the eastern and western edge of this range is a great enclosed plateau or table-land, formerly marked on the maps as the "Great American Desert," but it has proved to be of great value, not only in mineral wealth, but for farming as well. This great highland basin receives the waters of rivers which rise in the surrounding mountains, and gathers it into lakes which have no outlet to the sea. Of these the best known is called the Great Salt Lake in the Mormon country.

The range of mountains following the Atlantic coast-line reaches only from the State of Alabama, near the Gulf of Mexico, to near the mouth of the Saint Lawrence river. This range, like that on the west, is rich in springs and divides the rivers that flow westward to the Mississippi, and those that flow eastward to the Atlantic. Though not averaging more than 2,000 feet as against about 10,000 of the Rocky Mountains, the eastern range, sometimes called Alleghany or Appalachian, produces greater and more important streams for purposes of commerce and manufacture than those of the Pacific coast.

Fauna, etc.—Nearly all the animals known to the temperate zone of Europe thrive in the United States; notably horses, cattle, sheep, dogs, and fowl of every kind. The great plains of the west are covered with a natural grass which supports vast herds of cattle at a nominal expense. It is only in the more northerly States that these herds require shelter in the winter season.

The buffalo, as game, is nearly extinct, and the same may be said of the elk. The grizzly bear is still found in the fastnesses of the Rocky Mountains, and many of his species are common in the east as well as the west. The most exciting sport in the west to-day is perhaps hunting the Rocky Mountain goat, an animal surpassing the chamois in courage and power. In the north-eastern section, near the Canadian border, the moose is still to be found, and red deer and antelope are still abundant in all thinly settled neighbourhoods.

Snakes are found everywhere, but rarely intrude themselves upon the wayfarer. The rattlesnake is one of the most common as well as the most dangerous.

Minerals.—Coal is found in apparently unlimited quantity along the eastern range of mountains, particularly in Pennsylvania, and close to the coal are equally rich deposits of iron. Manufacturing is therefore carried on under the greatest natural advantages. Along the great lakes are rich copper mines. The Western or Rocky Mountain range is marvellously rich in minerals of all kinds, but notably gold on its western sides, and silver on its eastern. For over forty years mining for the precious metals has been carried on here, and so far there appears to be no diminution of the supply. In four years (1904–7) it is estimated the silver mines yielded over twenty-eight million pounds sterling worth, and the gold ones over sixty-five million.

Railways, Canals, Roads, etc.—Railways were introduced in America shortly after their successful inception in England, but owing to the very long distances to be traversed, the sparseness of the population, and the vastly cheaper communication by steamboats, the early progress of railway

construction was slow compared with that of England. Since 1860, however, railways have increased with feverish rapidity, so that there are about 334,000 miles in operation, all owned by private companies.

The canals are of great extent and value, the principal one being the "Erie Canal," connecting the great lakes with tide water on the Hudson river near New York, nearly 500 miles. Through this canal comes a large share of the corn that goes to Europe.

Climate.—The northern half of the United States is colder in winter and hotter in summer than it ever is in England or even in Central Europe.

The weather is, however, very capricious, and with the rapid shifting of the wind one may be in the same day hot almost to desperation, then cold to the point of needing a fire, then hot again, etc.

The *population* of America has increased very rapidly in the last hundred years. From less than four millions in 1790 it became nearly thirteen millions in 1830; over thirty-one millions in 1860; over fifty millions in 1880; and in 1900 no less than seventy-six millions. By the census of 1900 the whites represented over sixty-six millions; the blacks and Indians over eight millions; Chinese over 90,000. There are but 58,000 civilised Indians in the country, against about 235,000 who lead savage lives.

MAP OF NORTH AMERICA, SHOWING THE POLITICAL DIVISIONS.

The negroes were first introduced by the English as slaves in 1620 in the colony of Virginia, and rapidly increased owing partly to the profitable character of the planting in which they were utilised, and partly owing to the good care taken of them. The first census of 1790 enumerated the black slaves at 697,897. These in 1860 had increased to nearly four millions, in 1900 over eight millions.

Between 1855 and 1884 there came to America nearly three hundred thousand Chinamen, about half of whom have since returned after making their fortunes. They are not liked as settlers by those who feel their competition most keenly, and in 1882 Congress passed a bill forbidding their coming into the country for the space of ten years. The outcry against them was particularly strong in the neighbourhood of San Francisco, where they congregated in large numbers, and at once competed industrially with whites. A similar attitude to the Japanese has recently been shown (1909). The white population is derived from various sources, mainly British.

Political History.—The Dutch, Swedes, Germans, Spaniards, and French have all in turn made attempts to plant colonies in North America, but all have failed to materially modify the overwhelmingly English character of the institutions and the language. The most important colony was planted on the borders of Massachusetts Bay in the year 1620 by 102 Puritans, the "Pilgrim Fathers," from the eastern counties, who sailed from Falmouth in the *Mayflower*. They reached the New World with no knowledge of the particular country they were come to, about two weeks before Christmas in a winter of extreme severity, and immediately organised themselves into a civil community according to the tradition of free Englishmen.

The *Mayflower* returned to England to bring more Puritans over, and this emigration continued steadily in the same direction.

The New England colony rapidly increased, and the English spirit of adventure soon showed itself in the way new land was acquired to the westward as soon as the necessity for expansion was felt. From Massachusetts Bay adventurous bands penetrated the forests, planting colonies of Englishmen everywhere until soon they had crossed the Connecticut river and reached the Hudson. The Dutch who had settled there were easily dispossessed, and New York was the name given to what had been formerly known as New Amsterdam. From the south came also a movement of adventurous Englishmen who had gone to Virginia in 1607. These were not Puritans, but Cavaliers. They had large estates, introduced negro slavery into the country, and reproduced something of English country life on a large scale, excepting that negroes took the place of the usual tenantry. The Quakers later made a strong colony in Pennsylvania; the English Catholics in Maryland; and by the middle of the eighteenth century the whole Atlantic seaboard from Florida, under Spanish rule, to

Canada, under French, could boast of being one English country.

In 1759 Canada was taken from France after a gallant struggle in the course of a seven years' war which concluded in 1763.

In 1765 the English Ministry attempted to lay taxes on the colonies, which they resented as unconstitutional, insisting that there should be no taxation without representation; that they were Englishmen and not a conquered country; that they had borne heavy burdens for the mother country in fighting their country's battles with the French. The Crown insisted, however, and the irritation became aggravated from year to year. The colonies united to obstruct measures which they regarded as illegal. The first blood was spilled in 1775.

The war thus opened lasted until 1783, when the last British soldier embarked at New York, and the "United States of America" was recognised.

The close of the revolutionary war left the country in a painful condition politically, although materially she had suffered comparatively little. The need of a common government stronger than a mere temporary federation was keenly felt, particularly to make the country appear respectable amongst other nations.

In 1789, after much debate, opposition and amendment, the constitution under which Americans now live was brought to perfection and subscribed by the majority of States. Washington was elected for the term of four years to be President, and on the expiration of this term was re-elected for another. This was fortunate for the country, as it stood in great need of the guidance of a man so moderate in his views.

In 1799 the United States had a naval war with the French Republic which lasted two years, and which demonstrated once again that New Englanders could build, man, and fight frigates in a manner worthy of their ancestry. The French were defeated wherever the fighting force was anywhere equal. The Napoleonic wars that followed embroiled America once more with the mother country (1812 to 1815), a war in which both sides fought with characteristic courage, and from which neither can be said to have derived any particular satisfaction.

In 1860 the slavery question, that had been a growing source of uneasiness to politicians ever since the foundation of the government, came to a head, with the attempt on the part of one-half of the country to secede from the other.

The North fought to prevent the dismemberment of the Union; she put into the field at one time a million of men, and by the year 1865 forced the last remnant of the Southern army, numbering not more than 30,000 men, to surrender. The war was fought to the bitter end, and when the last rebel had laid down his arms no pains were spared to bury the past and reconcile the South to the new order of things. Jefferson Davis, the Southern leader, was allowed to go free, as well as all others who had taken part in the great conspiracy to overturn the government. No Southerner was deprived from exercising all legal rights he formerly enjoyed, excepting as regarded blacks. Slavery was abolished by one stroke of the pen, as a war measure in 1863, and after the declaration of peace the country would not listen to the idea of reinslaving blacks.

Apart from slavery the question of Free Trade or Protection has had much to do with producing irritation between the agricultural and manufacturing sections of the country from the adoption of the constitution to the civil war.

In 1898, in consequence of the state of affairs in Cuba, the United States declared war with Spain. After a brief campaign, in which America gained brilliant naval victories at Manila and Santiago, Spain was compelled to admit defeat, and Cuba was released from her rule, and for a time placed under the protectorate of the States. In 1901 Cuba became a Republic. The Philippine Islands were also ceded, but another war was necessary in order to bring them to submission to America.

Government.—The constitution of the United States is the natural outcome of the doctrines of civil liberty and self-government which the Puritan Englishmen of the year 1620 brought with them. According to this constitution, the President, or head of the State, is elected for four years. He has frequently been re-elected at the expiration of his term of office, but never more than once. He appoints the heads of departments, who form his cabinet. These do not sit in the House, and are responsible only to him, retiring of course upon the expiration of his legal term of office.

Members of Congress, corresponding to the English M.P., are elected for two years, are paid, meet each year, and exercise powers analogous to the House of Commons. The Upper House is composed of two representatives from each of the forty-six States, who are not, like the Congressmen, elected by the people, but by the local legislatures of the respective States.

Laws must pass both Houses and receive the President's approval—which he very often refuses. When he does so, Congress may introduce the same law and pass it in spite of his veto; but this is rarely done, for the President does not exercise his highest prerogative without giving reasons which satisfy the public sentiment of the country if they do not that of the Congress. But even if the President should allow a bad law to pass, there is another constitutional safeguard in the shape of a Supreme Court, whose members are selected from the most eminent judges, appointed for life and entrusted with the task of deciding whether or not laws are in conformity with the constitution.

Religion.—The constitution grants equal rights to the adherents of all creeds, and nearly every known religion is represented. Roman Catholics represent the strongest single sect, the most strongly organised and the most aggressive, claiming in 1906 about twelve million adherents. The Protestants (all sects) return about thirty-three million church members or communicants; the Mormons number nearly 256,000. [MORMONS.]

Education.—But for the blacks in the south and the mass of immigrants, the United States would appear well educated. In 1880, 17 per cent. of the population above 10 years of age were illiterates;

in 1900, 10·7 per cent. The most illiterate sections of the country are those occupied by the blacks in the south, and the ignorant immigrants who crowd into the large towns. The best schools are found in New England, and wherever the descendants of the English Puritans have led the way into the far west. No one in America has any reason for growing up without education, for the States and local communities are generous in providing well equipped schools of all grades and free to all.

Trade and Commerce.—The country has always manufactured sufficient for its needs, when forced to do so by war; and even in the 18th century exported many articles of manufacture. Since 1860, however, the government has been in the hands of protectionists, who place taxes upon imports so that the people may be forced to buy expensive things at home instead of cheap things abroad. This system has made the cost of living very high in America, and has made it difficult for American manufacturers to compete with England in neutral markets.

In 1890 the country revolted against a more than usually Protectionist Bill. Opposition was again shown very strongly during 1910.

MAP OF SOUTH AMERICA, SHOWING THE POLITICAL DIVISIONS AFTER THE DISPUTES SETTLED IN 1909.

The principal articles of export are cotton, corn, tobacco, meat, dairy produce, mineral oil, and wood. The manufactured articles exported are principally such as excel by displaying inventive power, and the result of very elaborate machinery—for instance, pistols, rifles, watches, clocks. In these the cost of labour is small compared with the profits arising from the use of machinery on a large scale.

Military and Naval.—The United States has a regular standing army of 83,000 (1908), including 4,209 officers, but exclusive of the provisional force and hospital corps. A large proportion of the cavalry are almost constantly occupied with the Indians on the Mexican and Canadian borders. This small force is intended as the skeleton, and in war time all men between 18 and 45 are liable for service. The armed, equipped, and drilled volunteers of the country number less than 215,000, a small number for a country whose population capable of bearing arms is so numerous.

The United States navy is relatively better maintained, and now includes many first-rate swift armed cruisers as well as battleships. The expense of this naval establishment is (1908-9) a trifle under twenty-five millions, while that of the army, excluding pensions, is a little over nineteen million pounds.

CANADA AND BRITISH NORTH AMERICA, *see* under these headings.

SOUTH AND CENTRAL.—*Extent, Configuration, Islands.*—South America, a continent, about eighty-six times larger than the United Kingdom, with an area of 7,465,000 square miles, and a population estimated at 34,643,500, or four inhabitants to the square mile. Geographically, South America is a peninsula joined to the continent of North America by the isthmus of Central America: this latter region has an area of 928,800 square miles, a population estimated at 14,656,000, or about twenty-one inhabitants to the square mile. The outline of South America is less monotonous than those of Australia and Africa, but is very much more so than the coasts of North America, and, like Africa, it tapers from its broadest part near the equator to an apex in the South Atlantic Ocean. The distance between the extreme northern and southern points, Point Gallinas (lat. 12° 29′ N., and long. 71° 31′ W.) and Cape Horn (lat. 55° 55′ S., and long. 68° 6′ W.), that is, nearly due north and south, is 4,514 miles. The distance between the extreme eastern and western points, from Cape San Roque (long. 35° 20′ W., and lat. 5° 27′ S.) to Point Parina (long. 81° 35′ W., and lat. 4° 50′ S.), or nearly due east and west, is 3,058 miles. The total coast-line is about 15,000 miles, or 4,000 miles less than that of the much smaller but far more varied continent of Europe. The islands of the South and Central American regions (excluding the West Indies) are comparatively few in number and insignificant in size, and consist mainly of the Patagonian Archipelago, Terra del Fuego, Falkland Islands and Georgia Islands in the southern extremity of America; Juan Fernandez, a few smaller islets, the Gallapago Islands, and the Revillagigedo Islands off the west coast of South America, and a few islets along the east coast.

Physical Features.—In the distribution of the elevations and depressions of the surface of South America, and in its fluvial systems, there is a remarkable analogy when it is compared with that of the North American continent, for in both continents there are vast plains in the interior, with mountain chains in the neighbourhood of the coasts, on the east and west borders of the continents. The principal features of South and North America, which may well compare with each other in their respective situations, courses, or directions, are the Andes and the Rocky Mountains on the west coast; and the Sierras do Mar and Mantigueira in Brazil, with the Appalachian or Alleghany Mountains in the United States on the eastern borders of the continents. The rivers Paraguay and Paraná are represented by the rivers Missouri and Mississippi; the Amazons and its vast lowland plains, by the river St. Lawrence and the great lakes region; the pampas lands of Argentina compare with the prairies of the United States; the Lake and Gulf of Maracaibo in the north of South America has its representative in Hudson's Bay in the north of North America; and finally, the great hollow or depression of the land, which extends right through the heart of the continent in a northerly direction, from Buenos Ayres by the rivers Paraguay, Guaporé, Madeira, Negro, and Orinoco to the Spanish Main, has its equivalent in North America in a somewhat similar course *viâ* the Mississippi and Missouri, the tributaries of the latter to Lake Winnipeg and Nelson river to Hudson Bay.

The prominent feature of South and Central America is the vast mountain system of the Andes which stretches for four thousand miles through the former in one unbroken range from south to north along the Pacific coast of the southern continent, and onwards in peaks or plateaux through the isthmus until it merges into the Rocky Mountains. The summits are higher than any in the New World. The broadest parts of the range are between the 20th and 25th parallels, where it is upwards of 400 miles across. The Andes surpass the Himalaya Mountains in length, breadth, and continuity, but not in elevation. No other region of the world contains so great a number of active volcanoes as are met with in the Andes. In the Patagonian section there are four; in Chile there are a great number of volcanic summits, the most notable being Aconcagua, 23,944 feet above the sea, the highest mountain in the system and the loftiest volcano of the globe. The Bolivian and Peruvian Andes contain few active volcanoes, but in the Columbian and Equatorial section, immediately to the north and south of the equator, volcanoes are numerous, such as Antisana, Cotopaxi, and other high summits, which are in a frequent state of eruption. The height of the perpetual snow-line of the Andes varies from 15,800 ft. under the equator, to 15,900 to 18,000 ft. in Bolivia, and to 14,000 to 6,000 ft. in Chile. There are several other minor mountain systems indicated on maps of South America, but with the exception of the Sierra da Mantigueira or of those in the States of São Paulo and Minas Geraes, Brazil, and of their ramifications into Bahia and Espirito Santo, and also of the central detached group of the Sierra dos Pyroneos in Goyaz, all the other map-indicated ranges are the scarped bluffs of table-lands surrounding, or bordering on, lower plateaux, which, from those lower levels, have the appearance of flat-topped mountains. In other cases, the so-called sierras or mountains are isolated vestiges of eroded table-lands. Brazil, especially, abounds with such examples.

Hydrography.—The drainage of 2,800,000 square miles of the South American continent finds its exit at the mouth of the Amazons, on the equator, and at the mouth of the Rio de la Plata at Buenos Ayres, consequently these two fluvial systems combined represent a system larger than any other two fluvial systems of the globe. The remaining riverine systems of South America, although insignificant in comparison to those of the Amazons and Plata, are nevertheless amongst the great rivers of the globe, and consist of the Rio São Francisco, draining the Eastern regions of Brazil; the Paranahyba in north-eastern Brazil, and the Orinoco and Magdalena rivers in Venezuela and Columbia, in the north of South America. The tropical zones of South America, east of the Andes, are generally some of the most abundantly watered regions of the globe; but the north-east portions of Brazil are occasionally subjected to long and devastating droughts, and there, the soil being mainly of a light or sandy nature, many of the large rivers and all the minor streams dry up, and compel the inhabitants (mostly stock-raisers) to abandon their herds and seek a refuge in the cities of the coast. Another region of South America—the desert of Atacama on the Pacific coast between 27° and 20° south latitude and situated between the Andes and the ocean—is a perfectly sterile tract, where a drop of rain never falls; it is a region of loose sand and naked rocks. The exceptional dryness of this region has, however, been the means of preserving intact its justly celebrated and valuable deposits of nitrate of soda. The northern coast regions of Brazil, on the contrary, at times show the greatest rainfall of any country on the globe. In Pará, in former years, it rained almost every day of the year. At S. Louis de Maranhão 276 inches have fallen in a few weeks. At Demerara six inches of rain have been collected within twelve hours, and at Cayenne as many as twenty-one inches in a single day. The tropical rainy season is, however, confined to a brief period with considerable intervals of bright sunshine, and occurs in some regions in the summer, in others in the winter. South America has few lakes of large size. The most important is Lake Titicaca (3,800 miles in area), 12,847 feet above the sea, and surrounded by some of the loftiest peaks of the Andes. Several salt water lakes occur in Argentina. Lake Maracaibo is near the shores of the Caribbean Sea, and Lagoa dos Patos in the south-east of Brazil is separated from the Atlantic Ocean by a long narrow strip of land. In the much smaller area of Central America lakes are more frequent, for instance, Lake Chepala on the Mexican highlands is of large size, and the still larger Lake of Nicaragua (3,500 square miles) is farther to the southward.

and also on high land, and there is also the Lake of Managua, or Leon (430 square miles) to the north-west of Lake Nicaragua.

Mineralogy.—South and Central America are particularly rich in minerals. Diamonds are found in Brazil, in the States of Minas Geraes, Matto Grosso, Bahia, São Paulo and Parana. Gold is found in every country of the continent. The Andes in Peru, Chile, and the highlands of Mexico have long been noted for their wonderful silver mines, and the metal has also been found in Brazil. Copper exists in Chile, Bolivia, Peru, Mexico, and Brazil. Tin has been discovered in Peru and in the sands of the Rio Paraopeba, Minas Geraes, Brazil. Coal is being mined in Chile and in Brazil. Iron is most abundant and rich in quality in Brazil, Columbia, Bolivia, Mexico, etc. Lead is found in Peru, Mexico, and Bolivia.

Vegetation.—In no part of the world is vegetation so varied and luxuriant as in tropical America. Botanists have already classified over 20,000 species of its flora, amongst which in the Amazons alone are over 100 varieties of palms, and 550 of orchids. It would therefore be useless to attempt to describe it by mentioning a few examples; suffice it to say that there is an enormous variety of timber for construction of all kinds, textile, oleaginous and aromatic plants, gums, resins, dye woods, and alimentary roots and medicinal plants. The virgin forest of the Amazons, 1,300 miles long by 800 miles broad, is the largest forest area of the globe, and amidst its many wonderful productions no one excels in commercial importance the indiarubber tree. Seventeen thousand tons of rubber have been annually exported from this rich floral region, representing a value of between six and seven millions sterling, all of which has been obtained from the wilds of this vast forest. Coffee is the principal cultivated product of Brazil, Venezuela, and Mexico, and other Central American States.

Fauna.—For the sportsman, especially the hunter of large game, Africa is infinitely preferable to South or Central America, where the larger animals, few and far between, are only the tapirs, the jaguars, pumas, and the camel of the Andes, the llama, the capybaras or waterhogs, the large ant-eating bears, and the South American ostrich, the rhea. The forests abound with strange and beautiful insects, and occasionally monkeys, but otherwise little other animal life is there met with. It is in the breezy, sunny, flower-decked plains or rolling uplands, or by the river side, that numerous birds and quadrupeds and glistening insects and snakes are found. The rivers of South and Central America are generally well stocked with great varieties of fish, and shrimps, prawns, lobsters, and other crustaceans are very abundant on the coasts, as well as oysters and many other species of testaceans, which in some places on the seaboard of Brazil are the almost exclusive food of the poor inhabitants.

Population.—The aboriginal inhabitants of South and Central America, excepting perhaps those of Peru conquered by Pizarro, show strong evidences of a common origin in some Mongolian race or races. There is a more strongly marked distinction between the North American Indians and the copper-coloured aboriginals of South America in language, habits, and customs and physical characteristics, than between the Hottentots and Zulus of Africa. The South American aboriginal is light copper or olive in colour, some are almost white; the hair is coarse, black and straight, the stature is below the average Circassian standard, the head is large, the eyes slanting, the face is generally devoid of hair and broad with prominent cheek bones, the nostrils are wide and the nose often aquiline, the neck is short, the shoulders broad and chest deep, the hips are narrow, the arms long, the hands and feet small and delicate, especially the hands. The aboriginals of South America are divided into two great families, the Guarany and the Tupy, but the difference is mainly one of dialect and location. The Guaranies occupied the southern regions and the Tupies the northern and central regions of South America, spreading into Central America and the West Indies. These two stocks have been subdivided into an infinite number of distinct tribes, each one speaking a different dialect from the others, and somewhat differing from each other in habits and customs. The population of South and Central America consists of Whites, Indians, Negroes, and a mixture of Indian and Negro, Indian and Spaniard, Indian and Portuguese, Negro and Spaniard or Portuguese, and the result is the ringing of the changes of one such mixture with another, known collectively as Mestizoes (half-castes), such as Ladinos, Zambos, Mulattos, Quadroons, Octoroons, and various other subdivisions with different names according to their various degrees of descent. In Mexico alone, the number of known Indian tongues number 51 distinct languages, and 69 dialects, to which are added 62 idioms now extinct.

	Area in square miles.	Population.	Pop. per sq. mile.
Brazil	3,258,160	17,000,000	5·4
Argentina	1,135,850	6,865,690	5·7
Bolivia	605,450	2,049,070	3·3
Venezuela	393,880	2,664,250	6·7
Colombia	485,100	4,333,000	10·
Peru	695,730	4,610,000	6·6
Chile	292,500	3,254,420	11·1
Ecuador	116,000	1,272,000	10·9
British Guiana	90,280	304,100	3·3
Paraguay	98,000	631,350	6·4
Uruguay	72,220	1,042,670	14·4
Dutch Guiana	46,050	81,040	1·7
French Guiana	30,500	39,320	1·3
Totals for South America	7,269,650	44,086,910	7·07
Mexico	767,000	13,605,920	17·7
Nicaragua	49,200	420,000	8·5
Guatemala	48,300	1,882,990	39·2
Honduras	46,260	500,120	10·9
Costa Rica	18,400	351,170	19·5
British Honduras	7,540	43,250	6·14
S. Salvador	7,220	1,116,250	159·4
Totals for Central America	943,920	17,919,700	17·95

History, Political Constitution, Religions, etc.—The Spaniards and Portuguese were the discoverers of South and Central America. The former under Christopher Columbus first sighted the Guianas in 1458, and again under Vasco Nunez, in 1504. Venezuela was discovered by Columbus in 1498, and Mexico by him also in 1519; Peru by Pizarro in 1524, and Argentina by Juan Dias de Solis in 1513. Cape St. Augustine in North Brazil was first sighted by Vicente Yunez Pinzon, a former companion of Columbus, and the Portuguese, Pedro Alvarez Cabral, completed further discoveries of that country at the close of the fifteenth century. The whole region of South and Central America thus became colonised by the Spanish and Portuguese, the latter retaining Brazil and losing Uruguay. At various periods, the English, French, and Dutch contended with the Spaniards and Portuguese for the possession of various regions in Argentina, Uruguay, Brazil, the Guianas, and Venezuela. The Dutch especially for many years occupied a large portion of N.E. Brazil, and the French at one time occupied Rio de Janeiro. The English now only possess British Guiana and British Honduras; the French hold French Guiana, and the Dutch, Dutch Guiana. For about 300 years the crown of Spain controlled the destinies of the Spanish colonies, until, one and all, taking advantage of the French invasion of the mother country, they succeeded in obtaining their independence; Mexico became independent in 1822, and in 1836 Texas fell to the United States. Argentina was the first to fight for its liberty, which it gained in 1810. Columbia followed in 1817, Chile in 1813, Peru in 1821, Venezuela in 1819, Bolivia in 1824, and the smaller states of Central America in about similar epochs. The whole of these separate nations of Spanish speaking peoples adopted republican government. On the other hand, the Portuguese in Brazil, on separating from the mother country, maintained a monarchical régime until 1889, when the Emperor Dom Pedro II. was deposed by a military insurrection, and a republic proclaimed and confirmed by the people in 1890.

With the exception of British Guiana and British Honduras, the national religion of the whole of the nations of South and Central America is that of the Roman Catholic Church.

Climate.—The climate of the vast region of South and Central America varies from the Arctic cold of Cape Horn, Patagonia, and the perpetual snows of the summits of the Andes to the sweltering heat of the summer of the tropical lowlands. Collectively, however, the north coast of South America and the coast-line of Central America are undoubtedly extremely hot and unhealthy regions. The equatorial regions do not show so high a temperature as do India, New York, or even London at times; the temperature is equable throughout the year, 75° to 90°.

American Indians. [INDIANS.]

Americanisms, words or phrases that have originated in America or that possess a different meaning from what they do in proper English. Of the many thousands of Americanisms derived from these various sources, the following may be taken as specimens:—

Account, in the phrase "no account men," meaning men of straw.

All-fired, a vulgarism intended to convey ultra-superlativeness, as in the phrase "an all-fired fool."

Back down, to yield.

Bad, in the sense of not feeling well.

Baggage, luggage.

Bee, as applied to such institutions as the spelling bee, ploughing bee, quilting bee, etc.

Bee-line, as the crow flies.

Being as, since or because.

Bet, in the phrase "you bet," meaning a strong affirmative.

Betterment, improvement.

Big, fine.

Biscuit, a hot roll.

Bloomer, in the phrase "bloomer costume," the name of the American lady that introduced it.

Bogus (from Borghese), a clever forger.

Bonanza, a profitable project.

Boss, a master or leader.

Bottom, in the phrase, "bottom dollar," taken from the gambling miners—the bottom dollar in a pile being the last one.

Boom, to push into prominence.

Brainy, intellectual.

Break, a mistake.

Bugs, insects generally.

Bully, in the phrase "bully for you," meaning "well done you."

Bunkum, bombastic talk about nothing.

Bureau, office.

Cañon, a ravine.

Carpet-bagger, in politics, an adopter of other men's ideas.

Cars, railway carriages.

Caucus, a political organisation.

Checkers, the game of draughts.

Chores, odd jobs.

Chunk, a lump of anything; a chunky man is a thick-set man.

Clearing, an open space cleared of trees.

Clever, amiable.

Conductor, a railway guard.

Corduroy road, a road laid with logs.

Corn, Indian corn or maize.

Corner, buying up more of an article than there is in existence.

Crank, an eccentric person.

Cotton, to take a liking to quickly.

Creek, a stream.

Cunning, pretty.

Deadheads, people that go to places of amusement and travel for nothing.

Depôt, railway station.

Diggings, the place one works at or lives in.

Donate, to subscribe.

Drummer, a commercial traveller.

Elevator, a lift.

Eye-opener, something startling.

Fall, autumn.

Fence-riding, the position of one who takes no side in a dispute but is ready to jump into the party likely to win.

Figure on, rely on.

Filibuster, an expedition of adventurers.

Fix, to do anything whatever; even a lady loosening her hair would say she was fixing it.

Fixing has a similarly wide meaning and may be anything.

Fizzle, to fail.

Flummox, in the sense of to yield.

Foreign, as applied to the English, who do not when speaking of foreigners include Americans.

Fraud, in the sense of a "sell."

Frazzled, to be in a state of extreme bodily exhaustion. Literally, "frayed out."

Good, in such an expression as "I feel good," meaning "I feel well."

Gerrymander, to split up constituencies so as to render the votes of the party in a majority ineffective.

Gin mill, a gin palace.

Gospel shop, where the gospel is preached.

Loafer, an idler.

Locate, to place.

Log rolling, applied freely to politicians who get assistance for their measures, repaying this assistance with similar assistance to their friends' measures.

Lumber, timber.

Ma'am, "Yes, ma'am" "No, ma'am," are continually in the mouths of Americans when conversing with ladies, just as "Yes, sir," "No, sir," and often "siree" are freely used in addressing their equals and companions

Operate, to work.
Pants, trousers.
Placer, a good gold find.
Pretty, very.
Prospecting, examining. [barn, etc.
A raising, the putting up of the framework of a house or
Ranch, a cattle farm.
Right, meaning just, *e.g.* "right here" is "just here."
Rooster, a cock.
Run, in such phrases as "to run a hotel," to manage.
Saloon, a drinking bar.
Sick, ill.
Skedaddle, to run away.
Smart, clever.
Smile, a drink.
Stakes, in the expression, "they pulled up their stakes," meaning they left.
Stampede; to make tracks, to depart.
Store, shop.
To be up a tree, to be in a difficulty.
Ugly, bad-tempered.
Valise, handbag.
Wire, a telegram.

There are certain phrases also, from the frequency and peculiarity of their use by Americans, that may be mentioned. These are "*I guess*," "*I reckon*," "*I calculate*." The American guesses, reckons, and calculates, when he really means to affirm. Another phrase, "*Is that so?*" is the American way of expressing surprise, and is often reduced to simply "*So-o-o?*" said in an interrogative tone of voice.

Amersfoort, a town in the province of Utrecht Holland, on the river Eem. It was once fortified, but the fortifications have been converted into public promenades, the gates only remaining. There is some trade in corn, tobacco, and herrings. Dimity, woollen goods, brandy, and glassware are made here.

Amersham, a town on the River Colne in Buckinghamshire. The Great Central and Metropolitan Railways have a joint station here. The making of wooden chairs, lace, and straw-plaits are the chief industries. Pop. (1901), 13,541.

Amesbury, or AMBRESBURY, a small town in the county of Wilts, on the River Avon, 9 miles from Salisbury. The town is connected with the Arthurian legends, and the remains of a remarkable Roman camp and of the Abbey exist close by. There is, too, a fine mansion built by Inigo Jones for the Queensberry family. Pop. (1901) 8,268. AMBRESBURY BANKS is also the name of the remains of an old British camp near Epping Forest.

Ametabolic, a term applied to those insects in which the larva resembles the adult, and the life history cannot be sharply divided into the stages larva (caterpillar), pupa (chrysalis), and imago (perfect insect); in other words, they do not undergo metamorphosis (q.v.). The earwigs are a well-known example.

Amethyst, a violet variety of quartz (SiO_2), coloured by a trace of manganese-peroxide, supposed by the ancients to be a charm against drunkenness. It occurs in Scotland, but is largely obtained from Brazil. The more valuable *oriental amethyst* is the similarly-coloured variety of sapphire (Al_2O_3).

Amhara, AMHARIC LANGUAGE. [ABYSSINIA.]

Amherst, JEFFREY, Baron Amherst, was born at Riverhead, Kent, in 1717. Entering the army in 1731, he became aide-de-camp to General Ligonier, and served at Dettingen and Fontenoy. He was sent as Major-General to America in 1758, and conducted the siege of Louisburg. On his return home in 1763 he was appointed Governor of Virginia. He became Governor of Jersey in 1770, and six years later was created a baron. In 1795 he was raised to the rank of Field-Marshal, and died in 1797.

Amherst, WILLIAM PITT, Earl Amherst, of Montreal, Kent, nephew of the foregoing, whom he succeeded in the barony, was born in 1773. After holding several court appointments he was sent out to China in 1816 to effect a commercial treaty with that empire. His reception at Pekin was so discouraging that he returned immediately. He was Governor-General of India from 1823 to 1828, and was created an earl in 1826. He died in 1857.

Amianthus. [ASBESTOS.]

Amice, an oblong piece of linen worn over the cassock and under the alb, stole, and chasuble. It is still worn abroad by Roman Catholic priests.

Amide, or AMINE, in chemistry, a substance which is derived from ammonia by replacing one of its hydrogen atoms by a monovalent acid radical. [Ex. acetamide $NC_2H_3OH_2$.] The amides are usually solid substances, with characteristic melting points, neutral to litmus, but combine readily with acids.

Amiens (Lat. *Ambiani*), formerly the capital of Picardy and now the chief town of the department of the Somme, France, stands on the banks of the

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river Somme about 40 miles from Boulogne. The Northern Railway of France has a large junction and works here. It is an ancient city, occupying the site of the Roman Somarobriva. Joining the League in 1588, it was reduced in 1592, and 5 years after was captured by the Spanish to be retaken immediately by Henry IV. The famous Treaty of Amiens was signed here in 1802. The older quarters are dirty and cramped, being intersected by canals; the new part is well laid out and handsomely built. The glory of the city is the magnificent Gothic cathedral (1220–1288), the proportions of which are

most effective, the length of the nave being 442 feet and its height 140 feet, whilst the spire is 420 feet high. The Hôtel de Ville is a fine building, and there are a valuable library, a museum, a high court, a college, and a bishop's palace. Many industries are carried on, the principal being cotton spinning and weaving, the manufacture of cotton-velvets, kerseymeres, woollen and linen fabrics, and leather.

Amines. [AMIDE.]

Amiot, JOSEPH, a French Jesuit missionary, born in 1718, who went out to China in 1740, and spent over 50 years in Pekin, dying there in 1794. He wrote many instructive works on the language, manners, and arts of the Chinese, including a *Life of Confucius.*

Amirante Islands, a group lying about 300 miles N.N.E. of Madagascar in the Indian Ocean, almost connected with the Seychelles, and dependent, like them, on the Government of Mauritius. They were ceded to England in 1814. The islands are small, averaging from 1½ to 2½ miles in length, and not rising more than 25 feet above sea level.

Amlwch, a small seaport town in the I. of Anglesea, N. Wales, 15 miles from Beaumaris, on the Chester and Holyhead Railway. It has a fair harbour. Extensive copper mines are worked in its vicinity.

Ammianus Marcellinus, a Latinised Greek, who, after serving as a soldier under Constantine and Julian, settled in Rome, and wrote his great work *Rerum Gestarum Libri XXXI.*, covering the period from Nerva's accession to the death of Valens (96–378 A.D.). Only 18 books are extant. Gibbon praises the author for accuracy, and his moderation in dealing with the development of Christianity is remarkable. He died about 390.

Ammocete, the larval form of the small Lampern (*Petromyzon branchialis*), formerly made a separate genus (*Ammocœtes*). [LAMPREY, FISHES.]

Ammon (Phœn. *The hidden deity*), the name of the chief god of the Egyptians, identified by the Greeks with Zeus, and by the Romans with Jupiter. He was personified in Egyptian art as a human being with a ram's head, but sometimes the body of a beast of prey is substituted for the human element. Thebes seems to have been the original centre of his worship, but his great temple and oracle were in the Libyan oasis of Siwah, which Alexander visited when he caused himself to be proclaimed the son of Jupiter Ammon.

Ammon, the son of Lot and progenitor of the Ammonites that dwelt on the confines of Manasseh, and for so many generations waged war with the Israelites until exterminated by Joab.

Ammonia, or VOLATILE ALKALI (NH_3). Although ammonia does not exist in nature in the free state, ammoniacal salts are widely distributed in the soil, and also occur in the atmosphere; they are characteristic products of the decomposition of organic substances containing nitrogen. Ammonia itself is a gaseous substance best prepared by heating ammonium chloride (*sal ammoniac*) with slaked lime, and collecting the product over mercury. It is a gas with a very pungent odour, which may be liquefied at 40° C. at the ordinary pressure of the atmosphere; by the rapid evaporation of this liquid ammonia may be still further obtained in white crystals. Ammonia is extremely soluble in water. It combines with acids to form ammoniacal salts, which, as a rule, are colourless and very soluble; the most important are the chloride and carbonate. In medicine it is used as an antacid and a stimulant.

Ammoniacum, a gum-resin exuding from *Dorema Ammoniacum*, and *D. Aucheri*, perennial umbelliferous plants, natives of Irak, in Persia whence the gum is shipped, *viâ* Bombay. It is reddish yellow, opalescent and slightly fœtid, and is used as a substitute for the allied assafœtida, in plasters for tumours, and as an expectorant. African ammoniacum, used for fumigation, is obtained from *Ferula tingitana*, a native of Morocco. It is said to be anti-spasmodic in its action, but is chiefly used to check secretion in chronic bronchitis. In the form of a plaster it is also employed externally to relieve inflamed joints.

Ammonites, a group of fossil molluscs related to the living Pearly Nautilus, being like it, *tetrabranchiate cephalopods.* Ammonites differ from Nautilus in having the chambers of their shells divided by foliated partitions, and in having the siphuncle, or tube passing through the chambers, lateral instead of central. The genus is confined to Secondary rocks, being first found in the Trias and dying out in the Chalk. The species number several hundreds, and some of them reach a diameter of over three feet. As many of the species lasted but a very short time, and are fairly abundant they have been used by geologists to divide the Secondary rocks into "zones." The name is derived from the resemblance of the shells to the ram's horns with which Jupiter Ammon was represented.

Ammonium (NH_4), the metal which is supposed to exist in ammoniacal salts; its existence being extremely probable in theory, and extremely difficult to prove in practice. Under conditions of temperature and pressure which do not obtain in our planet, there is little doubt that ammonium would be easily obtainable in the metallic state, and further might be incapable of resolution into NH_3+H. The existence of the ammonium compounds furnishes a strong argument in favour of the assumption that all metals are really complex in structure. Just as at lower temperatures and higher pressures we can conceive of ammonium as an irresolvable metal, so at higher temperatures and reduced pressures we can conceive of ordinary metals assuming the hypothetical condition now presented by the ammonium radicle. Alchemists in believing that all metals could be transmuted into gold were perhaps not, in the essence of the thing, such idle dreamers as they are commonly supposed.

Ammonius, nicknamed Saccas because he was originally a porter at Alexandria, took to the study of philosophy, established an academy, and became

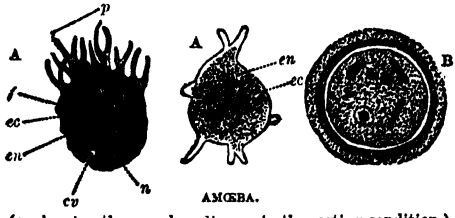
the founder of the Neo-Platonic school in which the systems of Plato and Aristotle meet in combination with some elements of Christian theology. Origen, Longinus, and Plotinus were among his hearers. It is said that he was a Christian by birth, but it is a matter of dispute whether he professed the faith himself. He died in 243 A.D. at an advanced age.

Ammunition, formerly military stores in general. The term is now confined to powder, shot, shells, etc., for firearms.

Amnesty, an act of oblivion passed after a political disturbance. Its effect is to so condone all offences committed against the State during the disturbance, that they can never be charged against the offending parties.

Amnion, one of the fœtal membranes, which, like the allantois (q.v.), is met with in the embryos of reptiles, birds, and mammals; these three groups of vertebrate animals being sometimes classed together as *Amniota*, as distinguished from fish and amphibia, in which no amnion is developed. The structure is formed by the growth of two folds, which arch over the embryo and finally unite in such a way that they constitute a double membrane enclosing it. The outer of these membranes is known as the false, and the inner as the true amnion, while between the latter and the embryo is left a space known as the amniotic cavity, which is filled by the amniotic fluid. The amniotic fluid is of low specific gravity and contains a small amount of albumen (q.v.) and of urea (q.v.). Sometimes rupture of the membranes does not occur in the ordinary way, and they are borne down in front of the child's head, and this constitutes what is known as a caul, around which phenomenon a perfect fabric of superstition has been woven by the imaginative.

Amœba. The amœba is a minute unicellular animalcule which lives in ponds, crawling over mud or submerged leaves. It is rarely more than one-fiftieth of an inch in diameter. When examined under the microscope it is seen to be a small



AMŒBA.

(A, showing the pseudopodia; B, in the resting condition.)
ec, ectosarc; *p*, pseudopodium; *cv*, one of the contractile vacuoles; *en*, endosarc; *n*, endoplast; *f*, undigested food.

particle of jelly-like PROTOPLASM, continually changing its shape by throwing out processes named pseudopodia (Fig. A); hence it is sometimes called the "Protean animalcule." It consists of an outer clear layer known as the ectosarc, enclosing a more fluid granular mass—the endosarc. In the latter are included an ENDOPLAST or "nucleus," a spherical or disc-shaped granular body, a CONTRACTILE VACUOLE, which alternately expands and contracts, and fragments of undigested food. The amœba is the best introduction to the study of biology, as it shows the phenomena of life in one of its simplest forms; thus the amœba has no special organs of sense, locomotion, reproduction, or nutrition. It moves by a mere flow of the body, it takes its food at any point, and similarly ejects any innutritious particles; it reproduces its kind by dividing into two, each half growing again to a full-sized amœba; it is therefore to a certain extent immortal, as death does not enter into the ordinary course of its existence. The amœba belongs to the class RHIZOPODA of the sub-kingdom PROTOZOA.

Amœbosporidia, a sub-class of the SPOROZOA, including an abnormal genus *Ophryocystis*, which is parasitic in a family of beetles.

Amol, or AMUL, a city on the river Heraz, in the province of Mazanderan, Persia, 12 miles from the Caspian Sea. There are remains of the tomb of King Seyed Quam-u-deen (1378), and of a palace of Shah Abbas. The town contains cannon foundries and iron works.

Amorites, a Canaanitish tribe overthrown by Joshua; their kings were Sihon and Og (q.v.).

Amoroso, in *music*, tenderly, with feeling.

Amorphous (Greek, *without form*), a term used in mineralogy and chemistry to indicate those substances which have no regular structure or are without crystallisation, as, for example, native minium.

Amorphozoa, a term often applied to the group of sponges.

Amory, THOMAS, an eccentric writer who was born in 1691, and spent most of his life in the solitude of his house at Westminster. In 1755 he produced a curious work of fiction called *Memoirs of Several Ladies of Great Britain, interspersed with Literary Reflections, etc.*, and a few years later appeared *The Life of John Buncle, Esq.* His writings are tinged with Unitarianism. He lived till 1788.

Amory, THOMAS, a Presbyterian divine, born in 1700. His scholarship was considerable, and until 1759 he held a professorship of classics and philosophy in the Dissenting Theological Academy at Taunton. Coming to London he was appointed pastor of the Old Jewry Chapel. He died in 1774.

Amos, the fourth of the Minor Prophets, a shepherd of Tekoah near Bethlehem. He was a contemporary of Isaiah and Hosea in their earlier days, and during his life Israel, having recovered from Hazael's invasion, was fairly prosperous, but in the luxury, avarice, and idolatry of his generation Amos saw signs of coming trouble. Syria, Tyre, the Philistines, and all the neighbouring states share his denunciations with Israel and Judah.

Amoy, a port in the province of Fo-Kien, China, situated on an island opposite Formosa. It is commanded by a strong citadel on the hills to the

landward, and possesses an excellent harbour. In 1841 it was captured by the British and was included in the five open ports by the treaty of Nankin. In 1853 the Taepings occupied the town and retained it for nearly two years. The tea trade forms the chief commerce of Amoy, but there are local industries, such as porcelain, paper, grass-cloth, umbrellas.

Ampelopsis. [VIRGINIAN CREEPER.]

Ampère, ANDRÉ MARIE, the eminent French physicist, born in 1775. He early showed great mathematical abilities, and in 1802 wrote a treatise on the doctrine of chances as exemplified in gambling. In 1805 he obtained a post in a Polytechnic school, and in 1820 he was appointed professor of physics in the College of France, and devoted most of the rest of his life to the investigation of electrical and magnetic phenomena. He suggested the electric telegraph in 1822, and in 1826 published his theory of electro-dynamics based on the discovery of the mutual attraction and repulsion of currents. He may be regarded as having first distinguished kinematics from dynamics. He died in 1836 at Marseilles, and his name has been perpetuated as a measure of electricity.

Amphiaraus, the semi-divine soothsayer of legendary Greece, was the son of Oïdeus (or perhaps of Phœbus) and Hypermnestra. He contended with Adrastus for the throne of Argus, but came to terms with him and married his sister Eriphyle. He took part in the chase of the Calydonian boar, and in the Argonautic Expedition, but tried to shirk the war of the Seven against Thebes, knowing it would be fatal to him Eriphyle betrayed him, so he went to his doom, enjoining his son Alcmæon to avenge him. After his death he received divine honours at Oropios in Attica. [ADRASTUS and ALCMÆON.]

Amphibia, a term used by Linnæus to include reptiles, the modern class Amphibia, and some fishes; Cuvier adopted the term, but reduced the group by leaving out the fishes. It is now taken to include animals between the class Pisces (fishes) on the one hand, and the class Reptilia (reptiles) on the other, and was united by Huxley with the former class in his division Ichthyopsida (q.v.). The amphibia include four orders: Urodela (newts and salamanders), Anura (frogs and toads), Peromela (limbless snake-like forms), and the extinct Labyrinthodonta (see these words). The Amphibian embryo is never furnished with an amnion, and the urinary bladder is the only representative of the allantois; gills are developed and persist for a longer or shorter period; but true lungs are always found in the adult. The limbs when present are arranged as in the higher vertebrates, and terminate typically in five digits; when median fins occur they are never furnished with fin-rays.

Amphibole. [HORNBLENDE.]

Amphictyon, a mythical Greek hero, to whom is assigned the establishment of the famous Amphictyonic Council that met twice a year at Thermopylæ and Delphi alternately to settle matters in dispute between the different states. In early times only 12 delegates composed this body, but as many as 30 took part in the deliberations before the final extinction of Greek independence. The institution undoubtedly had its origin in a desire to preserve the peace during great religious festivals and to protect the common shrines of Hellas. Out of this beginning grew something like a system of international law. The decisions of the council were several times enforced by arms, and the wars that ensued are known as "Sacred Wars." Philip of Macedon made one of them a pretext for entering the assembly, and exercising a powerful influence over Greek affairs.

Amphidiscs, the variety of spicules (skeletal structures) characteristic of the fresh-water sponge (*Spongilla*).

Amphimorphæ, a group of birds in Huxley's classification, corresponding to the Phœnicopteridæ of older systems.

Amphion, twin brother to Zethus and son of Antiope and Zeus. Exposed on Mount Cytheron, the two children were rescued by a shepherd. Amphion invented the lyre; he attacked Lycus, his putative father, seized Thebes, and reigned there conjointly with his brother. Somewhat inconsistently he is reputed to have built Thebes by the simple process of coaxing the stones into position by the notes of his lyre. It was probably another Amphion who married Niobe.

Amphioxus. The Amphioxus or Lancelet is a small worm or fish-like animal about two inches long, which lives half buried in the sand banks of

AMPHIOXUS.

the Mediterranean, round the Channel Islands, etc. It belongs to the phylum CHORDATA, and is of great interest, owing to the light it throws on the evolution of the vertebrata. It has neither skull, jaws, limbs, brain, heart, nor kidney. The possession, however, of a cartilaginous rod (the notochord), homologous (q.v.) to the vertebral column of the vertebrates, shows that it is most nearly allied to this group. The nervous cord immediately overlies the notochord, and is specialised in places to serve as organs of sight and smell. It has affinities with the ASCIDIANS, which it connects with the vertebrate division of the chordata.

Amphipoda, an order of the sessile-eyed CRUSTACEA or ARTHROSTRACA, including the fresh-water shrimp (*Gammarus*), the sandhopper (*Talitrus*), and the whale-louse (*Cyamus*). As in all typical *Crustacea*, the body consists of three regions, head, thorax, and abdomen, divided into segments, each of which bears a pair of limbs. In this order there are six or seven segments in the thorax, the middle segment of the body; upon the limbs attached to this region are borne three pairs of small, soft, sac-like structures, by which the blood is aerated; these are

known as "vesicles." The abdomen, or hindermost region of the body, may be rudimentary as in the sub-order LÆMODIPODA, or it may consist of seven segments with seven pairs of appendages, of which the first three pairs are adapted for swimming.

Amphipolis, a town at the mouth of the river Strymon in Thrace. Originally founded by Athenian colonists, it became one of the frontier towns of Macedonia. It was taken by the Spartans in the Peloponnesian War (422 B.C.), and Philip seized the town in 358 B.C. The modern name is Jeni Keui.

Amphisbæna, a mythic serpent of Libya, fabled to have two heads, and to be able to move backwards or forwards with equal facility. The idea lingered on till recent times, and Tennyson aptly embodies the popular notion of this fabulous animal when he speaks of

> "Two vipers of one breed—an amphisbæna,
> Each end a sting."

The name is now applied to a genus of limbless lizards, with thirteen species, from Spain, Northern Africa, Asia Minor, South America, and the West Indies. They are from 18 to 24 inches long, and of nearly uniform thickness; the head is small, and there is scarcely any perceptible tail. They burrow in soft earth, and live on insects and worms.

Amphitheatre, an oval building, generally of very large dimensions, in which the Romans used to hold their public exhibitions. These buildings

AMPHITHEATRE AT ARLES.

were at first made of wood, but in the time of Augustus stone was employed; they were open to the sky, but an awning or *velarium* could be drawn across the top in case of rain or of excessive heat. The place where the actual show took place was termed the *arena*, and was in the centre; the gallery immediately surrounding the arena was known as the *podium*, and was reserved for the emperor, senators, and persons of very high rank; the next fourteen tiers of seats were cushioned and were reserved for the *equites;* the remainder of the seats were of stone, and were open to all. The Colosseum at Rome (612 feet long, 515 broad, and 160 feet high) is the best known example of this sort of structure still remaining; this is said to have contained 87,000 people. Many other examples, however, yet exist: at Cirencester and Dorchester, in England; at Arles and Nimes in France, while the one at Verona, in Italy, is one of the finest examples.

Amphitrite, the mythical daughter of Oceanus and Tethys, or of Nereus and Doris, who was induced by the skilful pleading of a dolphin to cast aside her vows of virginity and marry Neptune.

Amphitryon, King of Tiryns, in Argolis, son of Alcæus assisted Electryon of Mycenæ against the Teleboii, and was honoured with the hand of Alcmene. Whilst he was leading the Thebans against the Ætolians, Zeus assumed his form and his conjugal rights, with the result that Heracles and Iphicles were born. Hence his name has become a household word in connection with hospitality. On his return he found Zeus entertaining a party, and when he claimed his position as master of the house the guests supported the giver of the feast. Molière adopted the story in one of his plays, whence the expression, "Le véritable Amphitryon et l'Amphitryon chez qui l'on dine."

Amphiuma, a genus of Urodela in which the gills do not persist through life, from the southern United States. They are slender eel-like creatures, with four rudimentary feet, inhabiting the ditches of rice-fields, and feeding on small fish, fresh-water molluscs, and insects. Some forms have two, and others have three digits, and from this character two species have been distinguished, but as the number of digits sometimes varies in the same individual, the distinction is of little importance.

Amphora, a two-handled vessel, generally made of clay, used among the Greeks and Romans for holding wine, oil, or the ashes of the dead. The Roman amphora contained about six English gallons, the Greek holding nearly nine.

Amplexicaul (from the Latin *amplexus*, embraced, *caulis*, stem), a term applied to stalkless leaves, the basal lobes of which project on either side of the stem overlapping one another on the side opposite to that from which the leaf springs.

Amplitude, in astronomy, the distance of a heavenly body from the east or west points, at the instant of its rising or setting. The amplitude of a star is always the same; but that of the sun varies from zero at the equinoxes (q.v.) to a maximum at midsummer and midwinter. In oscillatory motion of a particle, the amplitude of vibration is the greatest distance of the particle from its mean position.

Ampthill (Ametulle), a market town of Bedfordshire, 8 miles from Bedford, on the L. & N. Western and Midland Railways. Straw plaiting and lace making are the chief local industries. Ampthill House is near the town. Pop. (1901) 2,177.

Ampthill, ODO WILLIAM LEOPOLD RUSSELL, Baron, grandson of the 6th Duke of Bedford, was born in 1829. He entered the diplomatic service in 1849, and after working at Vienna and Paris, and in the Foreign Office at home, he became attaché

at Constantinople during the Crimean war, under Lord Stratford de Redcliffe. In 1858 he was sent to Rome as Secretary of Legation, and he subsequently remained there on special service till 1870, his chief duty being to act as intermediary between the British Government and the Vatican. In 1870 he was recalled to take up the post of Assistant-Under-Secretary at the Foreign Office. Next year he became ambassador at Berlin, and held that position till his death in 1884. With Lords Beaconsfield and Salisbury he represented England at the Berlin Congress of 1878. In 1881 he received a peerage.

Ampul, a nearly globular vessel, a glass or earthenware flask narrowing towards the mouth, used among the Romans to hold unguents, perfumes, etc. Such vials were also used later for ecclesiastical purposes, such as holding the oil for consecration or coronation, containing the relics of saints. The *Ampulla* is the sacred vessel containing the oil used in the coronation service.

Amputation, the operation of removing a diseased or injured part of the body. In performing an amputation it is essential that the loss of blood should be reduced to a minimum, and that suitable "flaps" should be cut from the healthy skin and tissues, wherewith to cover the bones and secure a satisfactory stump. With the ancients amputation was rarely practised, as it was a most serious undertaking, their methods of checking the bleeding being crude, and limited to the use of hot irons and various styptics. In the modern operation the main artery supplying the part to be removed is compressed, either by means of the finger or with a tourniquet (q.v.), the flaps are then cut, the bone sawn through, and the bleeding vessels are then rapidly secured with artery forceps, and either tied or twisted, the flaps being finally sewn together, and a suitable dressing applied. Thus the hæmorrhage is but slight in amount, and even amputation at the hip joint, where the arteries involved are of large size, has become a practicable operation. Occasionally the circular is preferred to the flap method. Here the amputation knife is passed circularly round the limb, the skin having been previously drawn up as far as possible, so that it and the muscles may be "cut long," and so secure a covering for the bone. Whereas in the more usual form of operation the limb is transfixed with the knife and flaps are cut. In amputating at various points a certain definite routine is frequently observed. Thus, Syme's amputation through the ankle joint, Seale's amputation through the leg, and Chopart's and Lisfranc's through the foot, are favourite modes of operating in those particular situations. Previous to the days of anæsthetics rapidity was of essential importance in performing amputation. Nowadays, however, this is happily not a matter of such moment. Again, modern surgery, with its improved methods of treating operation wounds, secures much better results than was the case in earlier days.

Amraoti (Oomrawattee), the name of one of the Hyderabad assigned districts and of its capital city. Its area is about 2,560 square miles. Karinja, Baduera, and Kolapoor are places of some importance within the district. Amraoti, the town, forms the headquarters of the Commissioner of the province.

Amrita, the beverage of the gods of Hindu mythology; applied also in Tibet to a celestial tree bearing ambrosial fruit.

Amritsar, a division, district, and city of the Punjaub, British India. *The Division* is made up of the Amritsar, Sialkot, and Gurdaspur districts. Its boundaries are the Himalayas to the N.E., the Chenab river to the N.W., the Bias river to the S.E., and the districts of Lahore and Gujranwale to the S.W. *The District* has an area of 1574 square miles of level plain, depending on irrigation for water. The products are wheat, barley, millet, rice, and other cereals. Shawls resembling those of Kashmir are the principal manufacture. *The City* (*Amrita Saras*, Fountain of Immortality) takes its name and origin from the reservoir made there in 1581. The circumference of the city is 8 miles, but there are large suburbs. Its position on the Punjaub Railway makes Amritsar a great centre of trade, not only for the province, but for the transit of goods to Central Asia.

Amrooah, or AMROHA, an ancient Mussulman town in the N.W. provinces of India, 23 miles N.W. of Moradabad.

Amru, BEN-AL-AS, a celebrated Arab warrior, born about 600 A.D. He was at first a vehement opponent of Mahomet, but presently became one of his most ardent disciples. His military achievements, under the Caliph Omar, included the conquest of Syria, Egypt, Nubia, and Libya as far as Tripolis. He reduced Alexandria in 642. Othman, Omar's successor, deprived Amru of his governorship in Egypt, whereupon the latter espoused the cause of Mohavia, whom he placed on the throne. He died in 663.

Amsterdam (*The dam of the Amstel*), the capital of Holland, situated on the Amstel river, where it falls into the Y, an inlet of the Zuyder Zee. The city is built upon piles driven into a marsh, and is intersected by many canals spanned by no less than 300 bridges. The river separates the old from the new town. In the 12th century Amsterdam was a mere fishing village. At the end of the 14th century fortifications, now converted into promenades, were raised on the land side. The Spaniards held the place until 1578, and it was only after asserting its independence that the port began to prosper rapidly. In 1787 it was taken by the Russians, and for some years after 1795 it was subject to France. Its recognition as capital of the kingdom of Holland dates from 1808. Though no longer on the same scale as in the palmy days of Dutch supremacy in the East and West Indies, the trade of Amsterdam is still very great. The Helder and Wyk Canals give it ready communication with the sea, while the docks and basins provide room for a large number of vessels. Among the fine buildings that adorn the town are the Stadt-house (1648), the Exchange (1634), the

old and the new churches, the East and West India Houses, and the once famous Bank. Besides its commerce with all quarters of the globe, amounting

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to about half a million of tons yearly, Amsterdam has many industries, such as shipbuilding, chemical products, the weaving of damasks, velvets, and carpets, and above all the cutting of diamonds and precious stones. Spinoza was a native of Amsterdam, and Rembrandt made his home there.

Amulet, a charm—usually an inscribed stone or piece of metal—worn on the person as a protection against witchcraft or disease. Amulets are probably of Oriental origin, and are common in the East to the present day. In England in the seventeenth century the name was given to any object worn or carried for the prevention or cure of sickness. Burton says that "they are not altogether to be rejected. Peony doth cure epilepsy; precious stones, most diseases; a wolf's dung borne with one helps the colic; a spider, an ague," though he is of opinion that "medicines which consist of words, characters, spells, and charms, can do no good at all, but out of a strong conceit, or devil's policy, who is the first founder and teacher of them." The carrying a cramp-bone in the pocket is a familiar example of the use of the amulet.

Amur or AMOOR (Mantchu, *Saghalien;* Chinese, *Helong Kiang*), a great river of eastern Asia, which at its rise in Mongolia is known as the Argoun. Flowing N.E. the Argoun forms the boundary between Russia and China. On reaching Ust Strelka (lat. 53° 18′ N., long. 121° 24′ E.) it is joined by the Shilka, coming from the Trans-Baikal province of Siberia, and the united streams bear the name Amur, taking a course S.E. to the confluence of the Sangari, and thence N.E. to the Sea of Okhotsk, opposite the upper end of the I. of Saghalien. The city of Nikoliaievsk is at its mouth, and for the last 400 miles the river is wholly in Russian territory. The total length amounts to at least 2,500 miles.

Amygdaloid (from the Greek *amugdalŏs*, an almond) a geological term applied to lavas in which bubbles of gas, escaping from near the surface of the stream, have left cavities which have been drawn out into an elliptical form in the direction of the flow of the viscous mass, and after the consolidation of the rock have been filled in by percolation with mineral matter. The minerals thus filling up the cavities are termed *amygdules*, as, being often calcite or some other light-coloured substance, they resemble almonds in almond-toffee. The zeolite group commonly occur as amygdules.

Amyl (C_5H_{11}), a radical which enters into the composition of many chemical compounds, being generally found in the form of *amylic alcohol* or fusel oil (q.v.). Diamyl (*i.e.* two molecules of amyl) is a colourless liquid; a single molecule has never been obtained.

Amyl Nitrite, a valuable drug obtained from amyl alcohol. When inhaled it reduces blood-pressure, producing flushing of the face, throbbing of the arteries of the neck, a sense of fulness in the head, with giddiness, and increase in the pulse rate. Its chief use is in cases of angina pectoris, in attacks of which disease it affords almost instantaneous relief. It is often prescribed in the form of glass capsules, each containing a few drops of the drug. These are crushed in a handkerchief and inhaled by the patient when the seizure occurs.

Amyloid Disease, a form of disease in which a peculiar substance is found in the kidneys, liver, spleen, intestines, and other parts of the body, the deposition of which leads to serious interference with nutrition, and among other special symptoms to dropsy and obstinate diarrhœa. One of the chief exciting causes of amyloid disease appears to be long continued suppuration; it was not uncommonly met with years ago as the result of the formation of matter in the chest cavity in children, but improved methods of treatment have fortunately almost expunged this class of cases from the records of disease. The amyloid substance is by some regarded as new material deposited from the blood, by others it is considered as a product of tissue degeneration. It was first studied by Virchow, who named it amyloid, as he regarded it as allied to starch (*amylum*). It is now known however to be closely related to albumen in chemical composition.

Anabaptists. [BAPTISTS.]

Anabasis (*a going up*), the name given to Xenophon's famous account of the expedition of Cyrus the younger against his brother Artaxerxes, and the retreat of the 10,000 Greek allies. The term is also applied by Arrian to his account of Alexander's campaigns.

Anableps, a genus of Cyprinodonts, with three species, from tropical America. They are the largest fish of the family, being about a foot in length, and are remarkable from the position and

structure of the eyes. The cornea is crossed by a dark horizontal stripe of the conjunctiva, dividing it into an upper and a lower portion, and the iris is perforated by two pupils. According to Dr. Günther, this fish is frequently observed to swim with half of its head out of the water, in which position it can see as well as when below the surface.

Anabolism (from the Greek *ana*, up, *bŏle*, throwing), a term applied in physiology to those processes of metabolism, or change of food-substances, which consist in the building up of comparatively simple chemical compounds, such as the inorganic substances water and carbon-dioxide taken in by plants, into more complex organic compounds. It is sometimes termed constructive metabolism.

Anacanthini, an order of fishes in which the vertical and ventral fins have no spinous rays, and the ventral fins when present are either jugular or thoracic. It contains the cod and its allies, and the flatfish.

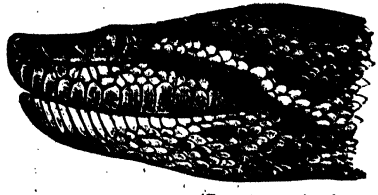
Anacharis. [ELODEA.]

Anacharsis, a Scythian philosopher of the 6th century B.C., who was reported to have visited Athens and won the friendship of Solon. Returning to his native land he was put to death by his own brother for attempting to introduce the Athenian code. His wise and witty sayings were recorded by Lælius, and also by Plutarch. The Anacharsis, who appears as the hero of the Abbé Barthélemy's famous romance, is represented as being a descendant of the sage.

Anachronism, the placing of an event or custom at a wrong chronological date. A celebrated anachronism is the incident of Æneas and Dido in Virgil's *Æneid*, as Æneas must have lived some two hundred years before the building of Carthage. Anachronisms are frequent in Shakespeare.

Anacoluthon (Greek, *not following*), a term in *Rhetoric* or *grammar* signifying want of sequence; it is frequent in colloquial speech, and is sometimes met with in poetry.

Anaconda (*Eunectes murinus*), a gigantic constricting snake from South America, of aquatic habits, whence it is also called the water-serpent. It is found in the rivers and swamps of Guiana and



HEAD OF ANACONDA (*Eunectes murinus*).

Brazil, and preys chiefly on birds and small mammals. The anaconda is ovoviviparous—that is, the eggs are hatched within the body of the female—and there are distinct traces of hind-limbs. It sometimes attains a length of thirty feet; colour rich brown, with two rows of large round black spots along the back, and a series of light golden-yellow rings edged with black on each side.

Anacreon, the Greek lyric poet, is said to have been a descendant of Codrus, King of Athens, and to have been born at Teos in Ionia about 562 B.C. Polycrates, tyrant of Samos, invited him to his court, and there he spent much of his life amidst the pleasures of love and wine, which form the only themes of his graceful and spirited odes. According to legend he died at the age of 85 from the lodgment of a grape-stone in his windpipe. He has given his name to a school of poetry, and it must be admitted that few of his followers have adorned sensuality with so light and delicate a touch.

Anadyomene (Greek, *rising out of*), the epithet applied to Aphrodite, who was supposed to have been born of the sea foam. The celebrated picture by Apelles, *Aphrodite Anadyomene*, was placed in the temple of Æsculapius at Cos, and afterwards in the temple of Venus at Rome.

Anadyr, or ANADIR, a river of Siberia, in the province of Primorsk, N. of Kamtchatka. Rising in Lake Ivatchno, it flows for 600 miles to the N.E., and discharges itself into the Gulf of Anadyr, an inlet of Behring Sea.

Anæmia, or BLOODLESSNESS, the condition in which the blood contains less than the proper amount of solid constituents. There is in particular a deficiency of red blood corpuscles. [BLOOD.] Poverty of blood may result from various forms of disease, thus copious bleeding will produce a temporary anæmia, and any bad habit of body may be accompanied by poorness of blood. The term anæmia, however, is usually applied to those conditions in which the small amount of the solid constituents of the blood seems to be the primary source of trouble, and of this disease there are two varieties. The one occurs mainly in young girls, and is known as green sickness or chlorosis (q.v.); the other, which is very much more rarely met with, is "progressive pernicious anæmia." The most noticeable symptom of anæmia is pallor, the poorness of blood revealing itself in the waxy look of the face, and particularly in the loss of the natural colour of the lips and cheeks; other distressing features of the disease are breathlessness, palpitation, headache, and general debility. The treatment of anæmia is in most cases eminently satisfactory—fresh air, good food, and the administration of iron are usually followed by a speedy recovery; indeed, the beneficial effects of medicine in suitable cases sometimes appear well-nigh miraculous; unfortunately but little can be done for true pernicious anæmia; the disease is, however, excessively uncommon.

Anaerobiosis, life without air, a physiological term for the life of certain fungi, such as the *Bacteria* (*Schizophyta*), and yeast (*Saccharomyces*), which grow most freely when not in contact with atmospheric oxygen. Their normal vital action shows itself in fermentative and putrefactive

processes, in which organic compounds are rapidly decomposed, and carbonic acid gas is given off.

Anæsthesia (Greek *a*, privative *aisthesis*, sensation) is a condition of insensibility to pain. It may be either local or general. A simple example of local anæsthesia is afforded by incised wounds involving nerve-trunks. Thus, if the nerves of the fore-arm be divided all sensation is lost in the parts which they supply. The operation of dividing nerves is sometimes resorted to in cases of persistent neuralgia, in order to sever the connection between the diseased portion of the nerve and the brain. Certain drugs, too, act as local anæsthetics. Cocaine, which has been introduced of late years, has been tried in dentistry, and has found an extensive application in eye surgery. The patient's eye, after being properly prepared by dropping a solution of the drug upon it, becomes quite insensitive; foreign bodies may be removed from the cornea, nay, even cutting operations may be performed without causing any pain. Again, ether spray is sometimes employed in producing local anæsthesia. In the condition of general anæsthesia a state of insensibility to all external impressions is produced. It is in conferring this boon upon mankind by the discovery of the anæsthetic properties of chloroform and ether that the medical art has achieved its greatest triumph Surgical operations are now performed without causing pain to the patient, and, moreover, they can be methodically conducted, there being no need for the hurry which was so desirable when every touch of the knife meant agony to the sufferer. Various means of producing anæsthesia were practised by the ancients. The Chinese employed a kind of hemp, the Greeks and Romans mandragora. These "drowsy syrups of the East," however, are only interesting from an historical point of view, the introduction of satisfactory anæsthetics being only accomplished in the nineteenth century. In 1800 nitrous oxide gas was inhaled by Sir Humphry Davy, who recommended its use, and it is now largely employed by dentists. In 1846 Dr. Morton, of Boston, employed sulphuric ether, and in 1847 Sir J. Simpson discovered chloroform, and these two drugs still hold the field against all competitors. Ether is, perhaps, the safer of the two, as chloroform depresses the heart's action, still the latter is better suited for certain cases; children and old people in particular bear it well, and ether, as it irritates the respiratory passages, is unsuitable in those who are the subjects of bronchitis. Moreover the danger attendant on the administration of anæsthetics in competent hands is exceedingly small. Very occasionally a death occurs while a patient is under their influence, but in most of these exceptional cases it is open to doubt whether it is the anæsthetic which is at fault. When operations are undertaken as a forlorn hope in desperate cases, it is unfair to attribute their want of success to the use of chloroform. In recent years the anæsthesia of the hypnotic state has been much talked of, and it is claimed by some that hypnotism will be used in the future in surgical practice. But few people, however, can be rendered anæsthetic by this means, and in them the remedy would seem to be more productive of harm than benefit.

Anagram, the letters of any word or sentence so transposed as to make another word or sentence. Thus, Florence Nightingale may be transformed into "Flit on, cheering angel." Anagrams were at one time very much in vogue.

Anahuac (Mex. *Near the water*), the Aztec name for the whole kingdom, but now restricted to the great central plain, of Mexico, which has an average height of 6,000 feet above the level of the sea, and extends over some 550,000 square miles —three-fifths of the entire state. The numerous lakes gave rise to the name.

Analcime (Greek, *analkis*, weak) a hydrous silicate of aluminium and sodium, crystallising in trapezohedra, belonging to the cubic system. It is one of the zeolite group (so-called because they froth up before the blow-pipe), is white, exhibits weak electrical characters when rubbed or heated, and occurs as an amygdule (q.v.).

Analgesics, remedies which relieve pain. [ANODYNE.]

Analogous, organs which perform the same function; *e.g.* the wing of a bird and that of an insect are said to be analogous. The term is used in contradistinction to homologous, in which the organs are built on the same plan: thus the wing of a bird and the arm of a man are homologous, being composed of the same fundamental elements, though greatly modified to perform different functions. Similarly, the hairs of a man, and the feathers of a bird, the quills of a porcupine, and the horn of a rhinoceros are all homologous; the last is only analogous with the horns of cattle and deer, as their structure is totally different.

Analogy, the similitude of relations between one thing and another. In *Logic* the term signifies resemblance of any kind on which an agreement, which cannot be founded on induction, may be based. "Analogical reasoning . . . may be reduced to the following formula:—Two things resemble each other in one or more respects; a certain proposition is true of the one, therefore it is true of the other." Analogical reasoning, though sometimes very effective, is often apt to lead the reasoner astray, as it is difficult to find a very exact analogy. The appellation of England as "The Mother Country," signifies that there is an *analogy* between the relations of England and her colonies and those of a mother and her children.

Analysis, CHEMICAL. The operations which are necessary to ascertain the chemical structure of substances come under the head of chemical analysis. If we require to know only *what* substances are present, irrespective of quantity, the analysis is called *qualitative*. Thus, to prove the atmosphere consisted of nitrogen and oxygen a qualitative analysis alone would be necessary. If, however, we further require to know *how much* nitrogen and how much oxygen, a *quantitative* analysis is requisite.

Quantitative analysis is usually subdivided into

Gravimetric and *Volumetric*; gravimetric, or weight-analysis, being characterised by the use of the balance; and volumetric analysis by the use of graduated vessels for the careful observation of *volumes*.

Analysis is also termed *Inorganic* or *Organic*, according to the nature of the substance under inquiry; and organic analysis is furthermore itself divided into *Ultimate* and *Proximate*, according as we attempt to discover the ultimate elements which are present, or those groups of elements which are known as proximate principles.

In the case of complex organic substances an ultimate analysis is often quite useless. With *blood*, for instance, it would be meaningless to ascertain how much carbon, hydrogen, and oxygen were present; it is first necessary, by the methods of proximate analysis, to split the blood up into albumin, fibrin, fat, hæmoglobin, mineral salts, etc. We may then apply the methods of ultimate analysis to these isolated individual substances if we will.

Analysis, MATHEMATICAL. [MATHEMATICS.]

Analyst, PUBLIC. [ADULTERATION.]

Anam, or ANNAM, a country, sometimes called an empire, which occupies the E. portion of the peninsula that forms the S.E. extremity of Asia, lying between lat. 9° 40′ and lat. 23° N. China bounds it on the N. and Siam on the W. It is made up of the provinces of Tonquin to the N., Cochin China to the S.E., and Cambodia to the S.W.; Laos being sometimes included. The French have a footing in these territories at Tonquin in the north, and in Cochin China at the southern extremity. A range of mountains runs along the coast, and the river Mekong or Cambodia holds a parallel course. The area is 106,000 square miles. The soil is rich on the whole and well watered, producing sugar, pepper, teak, sandalwood, cotton, and silk. The mineral wealth is very large. Various independent sovereignties have existed and still exist within this area; but China claimed a suzerainty over all. The French in 1795 began a policy of interference, chiefly on missionary grounds, which led ultimately to their occupation of Cochin China in 1860-2. France, by the treaty of Hué in 1884, practically obtained a protectorate over the whole country, which was recognised by China in the treaty of Tien-Tsin, 1885. The *Anamese*, that is, the civilised inhabitants of Tonquin and Cochin China, as distinguished from the *Moi*, or wild tribes of the Uplands, form a distinct branch of the Indo-Chinese family. They are traditionally descended from the *Giao-chi* of Tonquin mentioned in the early Chinese records, and still possess the physical peculiarity of a distended great toe characteristic of that race. Otherwise they are of a pronounced Mongoloid type, with broad flat features, high cheek bones, small nose, coarse, black and lank hair, rather small oblique eyes, colour varying from a dirty whitish yellow to chocolate, broad bony figures, low stature, averaging about five feet four inches. The moral character is generally described as disagreeable, harsh, unsympathetic, grasping, untruthful, and cruel, yet gentle towards their children, and treating the women with kindness and deference. They are nominally Buddhists, but less religious even than the Chinese, and the lettered classes are mostly sceptics. Yet the early Catholic missionaries were more successful in this region than in any other part of East Asia. Before the persecutions of the eighteenth and nineteenth centuries the Christian communities numbered nearly half a million, and since the French protectorate conversions have again become frequent. Christianity is professed by nearly all the Franco-Anamese half-breeds, who are a hardy race already acclimatised, of much lighter complexion and finer features than the pure natives. The language, which closely resembles Chinese, belongs like it to the isolating, or so-called "monosyllabic" type of speech, and is spoken in six tones with considerable uniformity throughout Tonquin and Cochin China. It is written with ideographs (each symbol representing not a sound but an idea) based on the Chinese system, but with numerous modifications and additions. The so-called quôcngu, or Roman orthography, introduced by the Portuguese, is now adopted in the native schools of French Cochin China. In the south-east extremity of the peninsula there still survives a remnant of the semi-civilised Cham nation, who show Malay affinities, and who formerly ruled over a large part of Indo-China.

Ananchytes. [ECHINOCORYS.]

Ananchytidæ, a family of sea urchins, species of which are mostly found in the Cretaceous rocks, but a few occur in later deposits, and some in the deeper seas of the present day.

Ananiev, or ANANJEFF, a town in the province of Kherson, South Russia, about 100 miles due N. of Odessa.

Anarchism. [SOCIALISM.]

Anarthropoda, an old zoological group, including all the worms which are composed of a number of similar segments.

Anas, a Linnæan genus equivalent to the modern family Anatidæ, containing the ducks, geese, and swans (see these words).

Anasarca. [DROPSY.]

Anastasius I., an officer of the palace in the reign of the Byzantine Emperor Zeno, whose widow he married and thus obtained the throne, 491, in preference to Longinus. Pious and just at first, he soon signalised himself by his fanatical support of the Eutychian heretics, and by his partiality for the *Blue* faction. Wars against the Persians and the Goths occupied much of his attention, and he built the wall that bore his name from the Propontis to the Euxine. He is said to have abolished the combats between men and beasts in the circus. He died in 518 at the age of 88.

Anastatic printing, a method of reproducing drawings, engravings, or any printed matter,

invented by Wood in 1841. The printed matter is first moistened with dilute phosphoric acid, which corrodes all blanks but does not affect the printed portion. The sheet is then transferred to a zinc plate, which takes a facsimile of the printed portion in reverse order. Gum and ink are then applied, then the acid and again ink, when an impression may be taken as clear as the original.

Anatase, an oxide of titanium (TiO_2), being one of three minerals having this composition. From one of these, brookite, it differs in crystallising in the pyramidal system; from the other, rutile, in being softer, lighter, bluish, and slightly different in form.

Anathema (from the Greek signifying *something set up*), the declaring of any things or persons to be accursed. The term is thus used several times in the New Testament, and later came to signify the excommunication and denunciation of an offender.

Anatinidæ, a family of bivalved mollusca; excepting one genus it is not found earlier than the Trias.

Anatomy, the science which deals with the structure of organised bodies. The etymological signification of the word is "a cutting up," and it is by dissection that the relations of different parts to one another are displayed. With the perfection of the microscope a new branch of the subject has been developed, namely, minute anatomy or histology (q.v.). Anatomy may be concerned with the structure of the animals or the vegetable kingdom, though it is usually in connection with the former that the term is applied. In comparative anatomy the different forms of structure met with in the animal kingdom are studied. The information possessed by the ancients with regard to the anatomy of the human body was very meagre, for the very sufficient reason that they practised no systematic dissections. Hippocrates, the father of medicine, seems to have had but little acquaintance with the subject. Aristotle studied the structure of animals, but the human body was apparently never dissected with the view of studying its anatomy until some 300 years before the Christian era. The works of the earliest writers on the subject, Herophilus and Erasistratus, have not however been preserved, and the earliest writings displaying any accurate knowledge of human anatomy, which have come down to posterity, are those of Galen, who lived in the second century after Christ. But little further progress was then made until the sixteenth century, when we meet with ardent students of the subject like Vesalius, Eustachius, and Fallopius, but the credit of the greatest of anatomical discoveries is due to an Englishman, William Harvey, who in 1619 announced his discovery of the circulation of the blood. From this time to the present day a steady advance in knowledge has been made. Willis elucidated the structure of the nervous system, Leeuwenhoeck and Malpighi applied the microscope to the study of minute structures, and Morgagni instituted the science of morbid anatomy. The wonderful industry of the brothers William and John Hunter in the eighteenth century produced great results, and the magnificent collection of anatomical specimens prepared by the latter forms the nucleus of the College of Surgeons' museum. Comparative anatomy made immense strides during the nineteenth century, the great sciences of palæontology and embryology have been developed in connection with it, and it has thrown much light on questions of physiology and pathology. The anatomy of the structure of which the human body is composed will be described under their several headings.

Anatropous (bent back), a term in botany applied to the ovule when, as in the majority of flowering plants, it is inverted by the more rapid growth of one side, so as to bring the micropyle, or opening in its structural apex, near to its base of attachment, and so facilitate the entrance of the pollen tube, which commonly grows along the moist placenta.

Anaxagoras, a distinguished Greek philosopher of the Ionic school, who was born at Clazomenæ about 500 B.C., and died at Lampsacus in 428 B.C. He established himself at Athens and counted amongst his pupils there Pericles, Euripides, Archelaus, and possibly Socrates. Carrying forward the speculations of Thales, Heraclitus, and Empedocles as to the physical origin and constitution of the universe, he seems to have held that the combinations of material elements necessary to form all existing substances must have required the operation of a Supreme Intelligence. He is also said to have believed the sun to be a mass of burning matter from which the other heavenly bodies derive light and heat, and to have known how to calculate eclipses. The Athenians, alarmed at his views, condemned him to death, but owing to the influence of Pericles he was allowed to go into exile.

Anaximander, an Ionian philosopher, born at Miletus about 610 B.C. According to Aristotle he conceived the physical substratum of things to be a chaotic mixture of elements out of which the definite and individual forms were evolved by mechanical processes. His astronomical theories and observations are interesting. He discovered the obliquity of the ecliptic; taught that the moon shone with light borrowed from the sun; believed in the cylindrical form of the earth; and invented charts and sundials. He died about 547 B.C.

Anaximenes I., of Miletus, a disciple of Anaximander, who flourished about the time of his master's death. He regarded air as the ultimate element from from which all existences spring, and maintained that the sun and earth were discs in form.

Anaximenes II., of Lampsacus, a pupil of Diogenes the Cynic, and subsequently a teacher of Alexander the Great, whom he accompanied in his expeditions, and whose history he wrote.

Ancelot, JACQUES ARSÈNE FRANÇOIS, a French dramatist, was born at Havre in 1794, and held a small official post. In 1819 he made a great hit

with a tragedy entitled *Louis IX.*, which was followed by *Fiesco* and *Le Roi Fainéant*. After 1830 he devoted his talents to comedy, producing *Le Régent*, *Madame Du Barry*, *Maria Padilla*, and many other popular pieces, besides novels and poems. He was elected to the Academy in 1841, and died in 1854.

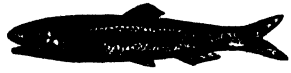
Ancestor Worship, a form of Animism (q.v.) arising from the belief that as the soul exercises power over the body during life, so after death it retains its activity and power and the characteristics which distinguished it in this world—the souls of good men becoming good spirits, and those of bad men evil spirits or demons. In some cases, as among the Zulus, the idea is carried back from one ghostly ancestor to another more remote, till the most remote—in other words, the first man—is reached, and erected into a supreme deity. Ancestor worship has a wide range in time and space, and survives to an appreciable extent even among cultured nations. [HAGIOLATRY, MANES WORSHIP.] Among races of the low culture it is practically universal; in China it is the dominant form of faith, and the Hindoos look to their divine ancestors for protection and favour. With regard to the practical effect of ancestor worship, Tylor considers that it "encourages good morals; for the ancestor who, when living, took care that his family should do right by one another, does not cease the kindly rule when he becomes a divine ghost, powerful to favour or punish." [TOTEM.]

Anchor, an instrument for preventing a ship or any other vessel from drifting, by mooring it to the bottom of the sea or river. It was invented in very early times, and consisted at first of large stones, or bags of sand, or heavily-weighted logs of wood. Later on the *fluke* or tooth was introduced, and ultimately the number was increased to two. The anchor in use at the present day consists of a long shank or bar of iron, which at its lower extremity branches out into two arms, at the end of which are the flukes mentioned above. At the upper extremity of the shank is the stock of wood fixed crosswise, and above that is an iron ring to which the chain or rope is attached. The action of the anchor is somewhat as follows:—The lower extremity of the shank is the first to strike ground, and this falls over so that one end of the stock or cross-beam rests also on the ground, thus, with the motion of the vessel, causing one or other of the flukes to enter the ground. The *fluke* itself is divided into the *blade*, the *palm*, and the *bill*. Large vessels have more than one anchor, the number varying with the size and service of the vessel. The men-of-war of the largest size carry no less than eight anchors, the best and small bowers, the two sheets, the two kedges, the stream, and the stern. Various improvements in the details of construction have been made from time to time by Rodgers, Lennox, Trotman, Porter, and Martin.

Anchorage, a place suitable for anchoring a vessel; the term also signifies duty or toll paid for permission to anchor at a port.

Anchorite. [HERMIT.]

Anchovy, the genus Engraulis, belonging to the herring family with forty-three species, from temperate and tropical seas. The common anchovy (*E. encrasicholus*) is a Mediterranean fish, rarely wandering northwards, from four to six inches long, with the upper jaw projecting beyond the lower, short anal fin, and the tail deeply forked;



ANCHOVY.
(*Engraulis encrasicholus*).

greenish-blue above, silvery white below. The anchovy fisheries of the Mediterranean are of considerable importance; the fish are taken at night when they approach the shore to spawn, cleansed, salted, and packed in barrels for exportation. Dr. Günther says that "lucrative fisheries might be established in Tasmania, where this species occurs, and Chile, China, Japan, and California possess anchovies by no means inferior to the Mediterranean species."

Anchovy Pear (*Grias cauliflora*), a West Indian tree belonging to the myrtle family. It bears leaves two to four feet long, and a foot across, large white flowers, and a fleshy fruit resembling the mango in taste. The fruit is pickled when unripe The plant is commonly grown in hothouses. In the hilly districts of Jamaica it attains a considerable height.

Anchusa. [ALKANET.]

Anchylosis, the condition of impaired mobility of a joint, caused by disease, involving the articular surfaces. Anchylosis may be fibrous or bony. In the former condition fibrous cords, the result of inflammation, bind together the joint surfaces. These "adhesions" are, in suitable cases, "broken down" by the surgeon so as to restore the movement of the joint. In true bony anchylosis there is absolute rigidity of the affected limb. This, however, provided the anchylosis has become established with the limb "in good position," is sometimes regarded as a result to be aimed at in certain forms of disease.

Anchylostoma, or *Sclerostoma duodenale*, a small worm, about half an inch long, which sometimes occurs in the human small intestine. It is unknown in England, but is not unfrequently met with in hot climates, particularly in Egypt.

Ancillon, FREDERIC, born in Berlin in 1766. He was appointed professor of history in the Military Academy, and was entrusted with the education of the Crown Prince, afterwards Frederic William IV. In 1831 he became Minister of Foreign Affairs. His great work, *Tableau des Révolutions du Système Politique en Europe depuis le XVme Siècle*, gives a masterly *résumé* of the principles of statesmanship up to the outbreak of the French Revolution. He died in 1837.

Ancona (Lat. *Ancona*, Gk. *a corner or elbow*), a very ancient port on the east coast of Italy, built on a point of land projecting into the Gulf of Venice, and about 125 miles north of Rome. Originally colonised from Syracuse, it was taken by the Romans in 268 B.C., and became a great naval and commercial station, being specially celebrated for purple dye. Trajan built a mole there in 107 A.D., and upon it stands a beautiful marble arch to his memory. In the middle ages Ancona was occupied by Saracens, Lombards, Greeks, and Germans, and was for a time a free republic. It then came under papal rule. The cathedral (St. Cyriac) dates from the tenth century. Clement XII. built the new mole, also surmounted by an arch. Taken in 1797 by the French, it was recaptured by the Austrians, and in 1814 restored to the pope. The French occupied the place again from 1832 to 1838. In 1860 the city and the province, to which it gives a name, were ranged in the kingdom of Italy. Ancona has always been a busy city, exporting and importing a large proportion of the goods produced or consumed in Italy, and manufacturing leather, paper, candles, silk, and verdigris. Latterly its importance was temporarily increased, as the English Peninsular and Oriental Steamship Company made it the starting point of their mail route to the East.

Ancon Sheep, a breed of sheep, descended from a ram-lamb with a long back and short crooked legs, born in Massachusetts in 1791. As these sheep could not leap over fences it was thought that they would be valuable, but they have been supplanted by merinos, and thus exterminated. They were remarkable for separating themselves from the rest of the flock when folded, and for transmitting their peculiar characteristics. They were also called Otter Sheep.

Ancre, CONCINO CONCINI, Baron de Lussigny, Marquis d', an Italian who accompanied Mary de Medici to France on her marriage with Henry IV. (1600), and was given a marquisate and other distinctions by Louis XIII. His influence over the young king and his reckless prodigality roused the jealousy of the French nobles. Concini was assassinated (1617), his wife burned as a witch, and his son disennobled. Ancre (dept. Somme) whence he took his title was changed into Albert.

Ancrum Moor, 5¼ miles from Jedburgh, in Roxburghshire, witnessed the defeat in 1544 of an English force of 5,000 men by the Scots under the Earl of Angus, and Scott of Buccleuch.

Ancus Martius, fourth king of Rome, grandson of Numa Pompilius, and successor to Tullus Hostilius. He defeated the Latins, Sabines, Venetians, and other neighbouring people, extending his territories to the coast, where he founded Ostia. By him the Aventine and Janiculum were enclosed in the walls of Rome, the Sublician bridge was built, and the Aqua Martia brought into the city. Supposed date 638—614 B.C.

Andalusia, an ancient division of Spain comprising parts of the classical Lusitania and Bætica, being bounded on the W. by Portugal and Estremadura, on the N. by New Castile, and on the E. by Murcia and La Mancha, on the S. by the Mediterranean. Seville is the capital. The Carthaginians settled here in the 4th century B.C., and were driven out in 205 B.C., by the Romans, who in turn gave way to the Vandals. The name is supposed to be a corruption of Vandalitia. The Visigoths, in 429 A.D., succeeded the Vandals; and the Arabs, in 711, made this district their headquarters in Spain, establishing the Caliphate of Cordova. In 1236 Ferdinand III. recovered Seville, but for two centuries later the Mohammedan invaders held their ground, and the population still contains a large infusion of Moorish blood. The country is very diversified. To the N. the range of the Sierra Morena cuts it off from New Castile; and the Sierra Nevada, reaching an elevation of nearly 12,000 feet, traverses the southern portion. The lowlands of the coast are warm and richly productive. Andalusia is now divided into the provinces of Cadiz, Seville, Jaen, Grenada, Huelva, Cordova, Almeria, and Malaga. The chief towns bear the same names. The vegetable products are grain, olives, oranges, figs, cotton, and sugar. The mountains yield all varieties of metallic ore. The horses are famous throughout Spain, as are also the bulls bred for the national sport. It has an area of 33,340 square miles.

Andalusite, a silicate of aluminium crystallising in large rhombic prisms, often of a white colour, and occurring in slates and schists.

Andaman Islands, a group of six large and many smaller islands, divided by Duncan Passage, in the Bay of Bengal (lat. 10° to 14° N., long. 95° E.). They were discovered by Peyraud, in 1607, and occupied by the English in 1791, but subsequently abandoned. In 1857, during the mutiny, they were adopted as a penal settlement, and are still used for that purpose. Port Blair on the south island is the seat of government. Lord Mayo, Governor-General of India, was assassinated there by a convict in 1872. Area 3,000 square miles. The *Andamanese* islanders, often wrongly called "Mincopies," have lately been carefully studied by Mr. E. H. Man, in a series of papers contributed to the Journal of the Anthropological Institute (1882-3). They are a homogeneous people, everywhere presenting the same uniform Negrito type—short stature (4 ft. 8 in. to 5 ft.), short woolly black hair, growing in spiral tufts, very dark, almost black, complexion, softened or undeveloped negro features—and generally resembling the other Negrito groups of the Malay Peninsula (Semangs), and Philippine Islands (Aëtas). But the language, of which there are two distinct branches, and seven or eight marked dialects, is entirely distinct from any other known form of speech, though in its morphology offering certain analogies both to the Dravidian of India and to the Australian family. They occupy a very low social state, living almost entirely by the chase and fishing, in small isolated groups of 50 to 80 persons, who wear scarcely any clothing, and

form both permanent and temporary encampments of wood huts, varying in size and durability. They have terms only for the first two numerals, though able to count by means of the fingers up to ten. Otherwise their natural intelligence is considerable; they are kind to their women and children, and the cruel, ferocious character formerly attributed to them is shown by Mr. Man to be based on misunderstandings between the natives and strangers landing on their shores. Since the British occupation and the establishment of penal settlements in the archipelago, the Andamanese have been brought more and more into contact with other people, and persons of mixed breed are now often seen in the vicinity of Port Blair. But the pure aborigines appear to be dying out. One large tribe some years ago numbering about 1,000 is now reduced to little over 300, and the whole indigenous population appears to fall below 4,000.

Andante, in *music*, a term used to indicate a somewhat slow measure of time. It is the measure of time between *larghetto* and *allegretto;* the term is frequently modified, as *andante con moto, andante sostenuto*, etc. Like allegro, and adagio, it is often used as the name of a movement or piece of music.

Andelys, Les, a town in the department of Eure, France, 27 miles south of Rouen. It is divided by the high road into Great and Little Andelys, the former on the Gambon river, the latter on the Seine. It contains a fine collegiate church, with good painted glass. Considerable cotton factories are established here, and the manufacture of artificial pearls and leather goods is also carried on.

Andermatt, or WISERN, a village in the canton of Uri, Switzerland, about 4 miles north of the St. Gothard Pass, where the road meets that coming from Hospenthal and the Furca Pass. Near it the Reuss river is crossed by the Devil's Bridge. The St. Gothard Railway has considerably damaged the trade of the village.

Andernach, an ancient town situated between Coblentz and Bonn, on the left bank of the Rhine, in Rhenish Prussia. It was once a Roman fort, and then the residence of the Merovingian kings. The Emperor Charles I. was defeated here by his nephew, Louis of Saxony, in 876. The ruins of the castle of the Archbishop of Cologne and traces of the old wall and gates still exist. The volcanic soil of the neighbourhood gives a supply of millstone grit and of hydraulic cements, in which a good trade is done.

Andersen, HANS CHRISTIAN, the celebrated Danish writer of romances and fairy tales, born at Odense in the Isle of Funen in 1805. His father, a poor cobbler, gave him but a slender education, and meant him to be a tailor. The boy, however, was resolved to go on the stage, and made his way to Copenhagen, where his good voice secured him an engagement at the Theatre Royal. This he lost when his voice broke, and he was not only rescued from destitution but was put in the way of getting an education by a benevolent official. His first book, *A Journey on Foot to Amager*, appeared in 1828, and for some years he was engaged in travelling. *The Improvisatore, Only a Fiddler, Fantasies and Delights*, a collection of poems, and *The Mulatto*, a drama, followed at short intervals. The imaginative works, for which he is best known in England, began with a series containing the *Ugly Duckling*, in 1835, and his masterpiece, *A Picture Book without Pictures*, was published in 1840. Many of these quaint, simple, touching little fables have won a world-wide fame. The royal family of Denmark honoured him with their esteem and friendship, but literary jealousies made him spend much of his life abroad. *In Sweden* and *In Spain* are records of travel at this period. His own story is charmingly told in *The Romance of my Life.* Returning to Copenhagen he saw his seventieth birthday kept as a national festival, and died soon afterwards, in 1875.

Anderson, JOHN, born 1726, one of the earliest promoters of scientific education for working men, and the founder of the Andersonian University in Glasgow. He was professor at first of Eastern languages, and afterwards of natural philosophy in that university, and wrote an excellent treatise on Physics. Sympathising with the National Convention of France, he hit upon the device of conveying news from that country to Germany by means of small gas balloons. He died in 1796.

Anderson, SIR GEORGE WILLIAM, K.C.B., a distinguished Indian civilian, born in London in 1791. Under Elphinstone he drew up the well-known Bombay Code of 1827, became member of council in that presidency, and acted for a year (1841-2) as Governor. In 1849 he was made Governor of Mauritius, but was soon after transferred to Ceylon. His health gave way, and he retired in 1855. His death occurred two years later.

Anderson, ELIZABETH GARRETT, M.D., the champion of the right of women to practise medicine, born in 1836. Under some difficulties she completed her medical studies at the Universities of St. Andrews and Edinburgh, and at the Middlesex and London Hospitals. The Licentiate of the Apothecaries Society of London was granted her in 1865, and in 1870 she received the degree of M.D. at Paris. As medical attendant to St. Mary's Dispensary and Physician to the East London Hospital for Children, she did excellent work. In 1871 she married a gentleman named Anderson, and has since then carried on a considerable private practice in London, writing, too, a number of papers on professional subjects.

Andersson, CARL JOHANN, the African explorer, born at Elfden, Sweden, in 1827. He accompanied Francis Galton to Africa, and remaining there pushed on alone to lake Ngami, of which he wrote an account (1855). Subsequently he explored the Okavango river, which formed the subject of another book in 1861. He then settled at Cape Town as an ivory trader, but died of dysentery in 1867 whilst travelling in the Ovakuambi country.

Andes, THE, a vast mountain system that forms the backbone of South America, and extends for 4,180 miles from Cape Pilares in the Straits of Magellan to the Isthmus of Panama. The width of the range varies from 40 to 350 miles, and its average elevation is 12,000 feet. As it passes from one country to another the chain is divided into the Andes of Patagonia, Chili, Bolivia, Peru, Ecuador, and New Granada. The loftiest peaks are:—

Aconcagua (Chilian Andes)	23,944
Gualatieri (Bolivian Andes)	22,000
Chimborazo (Ecuador)	20,517
Sorata (Bolivian)	21,290
Illimani (Bolivian)	21,150
Chiquibamba (Bolivian)	21,000
Arequipa (Peruvian)	18,373

Except the Himalayas, no mountains in the world can vie with these altitudes. Lofty table-lands, such as those of Assuay, Titicaca, Pasca, Quito, Bogota, and Cuzco, are a remarkable feature of the range. On the western side, owing to the steep declivity towards the neighbouring sea, there are no important rivers, but eastwards the Amazon,

ANDES: VIEW OF CHIMBORAZO.

La Plata, Orinoko, Maddalena, and other large streams flow down from this mighty watershed. The basins of the Orinoko, Amazon, and La Plata are separated by transverse offshoots from the magistral range. These are called the "Cordilleras." The Andes are essentially volcanic, and contain some fifty active volcanoes, whilst earthquakes are of frequent occurrence along the axis of the range. The geological structure accordingly displays granite, greenstones, porphyries, and other igneous rocks, flanked here and there by metamorphic schists and palæozoic strata, whilst the western slopes especially are covered with lava, scoriæ, and other recent volcanic products. Metalliferous veins are abundant, and of every variety. The silver mines of Peru have for centuries been famous, but the mineral wealth of the range has hardly as yet been explored. Many valuable chemical deposits are also found. Some geographers regard the Andes as being an extension of the mountain system of North America, but this view is probably incorrect. The first railway connecting the Atlantic and Pacific coasts of South America was completed in April, 1910, when the Trans-Andine tunnel (Los Andes—Mendoza) was opened.

Andesine, soda and lime felspar, one of the plagioclase (q.v.) group, containing equal proportions of soda and lime. This mineral forms, with hornblende, the rock known as andesite, from its occurrence in the Andes.

Andesite, a name applied by Von Buch to certain lavas in the Andes, consisting of plagioclase felspar, generally either andesine or oligoclase (q.v.), with hornblende, with or without quartz, and generally with some magnetite. They are of Tertiary age, and are well represented in Hungary.

Andiron, or FIRE-DOG, a name given to an article of furniture, formerly used to prop up wood whilst it was being burnt in the fire. Andirons were frequently of very beautiful design.

Andorra, or ANDORRE, a small semi-independent state occupying a valley on the south slope of the Pyrenees between Catalonia in Spain and Ariège in France. Its area is about 175 square miles. The principal means of subsistence is shepherding, but a certain amount of iron is extracted from mines. The chief town Andorra is on the Embalire river. The primitive Andorrans helped Charlemagne in a battle against the Moors (790), and received in return the privileges of a free state, certain imperial rights being reserved. These rights were transferred to the Bishop of Urgel. Henry IV., as Comte de Foix, annexed Andorra to France, but in 1790 its modified independence, subject to French protectorate, was fully recognised. The government is conducted by a Syndic, appointed for life, and twenty-four elective consuls. There is a militia 600 strong.

Andover, a market town of Hampshire, on the Ande, 12 miles N.W. of Winchester; formerly a parliamentary borough, it now gives its name to an electoral division of the county. The trade is chiefly in malt and agricultural produce, but some silk is manufactured. The L. & S. Western Railway has a junction here. Pop. (1901), 6,509.

Andover, a town in Massachusetts, which contains the famous Theological Seminary (founded 1807). Two academies also flourish there.

Andrassy, JULIUS, COUNT, born in 1823 at Zemplin in Hungary, represented Zemplin in the Diet (1847); took part in the revolution of 1848, and on its failure lived in France and in England until 1857. He then returned and was once more elected to the Diet, where he strongly supported Déak, especially in the unification of the empire, 1867. He largely brought about the alliance between Austria, Germany, and Russia, and in 1876 made every effort to avert the Russo-Turkish war. At the Berlin Conference in 1878 he acted with Prince Bismarck, and obtained the provinces of Bosnia and Herzegovina for Austria. In 1879, feeling incapable of holding ground against opposition,

he resigned in favour of Baron Haymerle. He died in 1890.

André, JOHN, born in London 1751. His family originally came from Geneva. Beginning life as a clerk, he entered the army, served with distinction in the American War of Independence, and became major and adjutant-general. Sir H. Clinton having a high opinion of his abilities employed him in ticklish negotiations with General Benedict Arnold, who proposed to surrender West Point to the British. In August, 1780, André, having crossed the Hudson in uniform to confer with Arnold, was foolishly induced to return in plain clothes. He was taken by the American outposts, and the papers found on him revealed his designs. Tried by court martial, he was condemned to death as a spy. His personal innocence and courage won him universal sympathy, but Washington would not spare his life. He was executed in the same year. A monument in Westminster Abbey preserves his fame.

Andrea da Pisa, or PISANO, a sculptor and architect, born in 1270. He was employed to carry out Giotto's designs for the façade of Santa Maria del Fiore at Florence, where he also constructed fortifications, and made the bronze gates that are now at the side entrance of the Baptistery. Some of the decorations of St. Mark at Venice are his work, as are those of the Baptistery of Pistoja. He died in 1345, leaving a son, Nino, who was as distinguished as his father.

Andrea di Castagno, a Tuscan painter, born in 1406. He was a pupil of Masaccio, and did the frescoes on the walls of the Podesta at Florence. On his deathbed (1480) he confessed that he murdered Domenico Veneziano after obtaining his secret of working in oil colours.

Andreossi, ANTOINE FRANÇOIS, COUNT, a Frenchman of Italian extraction, born in 1761. He took part in the French Revolution, and then served as an engineer and officer of artillery under Napoleon at the siege of Mantua and in the Egyptian expedition. He was appointed ambassador at Vienna and Constantinople, retiring in 1814. During the Hundred Days he joined his old master again, and was created a peer of France. After Waterloo he spent his life in writing memoirs and scientific works, dying in 1828.

Andrew, SAINT, apostle and martyr, a brother of Simon Peter, a native of Bethsaida, in Galilee. Originally a disciple of John the Baptist, he heard the testimony of his master to Christ (John i. 35–40), and followed the true Messiah, soon after bringing his brother with him. Andrew is seldom mentioned in the Gospel narrative. He concurred with Philip in introducing to our Lord certain Greeks (John xii. 22), and he was one of the four to whom the prophecy was given respecting the fate of the Temple. According to tradition, he laboured after Christ's resurrection in spreading the truth over Asia Minor, Scythia, and Thrace, and was himself crucified at Patræ, in Achaia, by order of Ægeus, on that particular form of cross (X) that bears his name. His martyrdom is commemorated by the Church on November 30. It is uncertain why St. Andrew was adopted as the patron saint of Scotland, but legend attributes the fact to the miraculous appearance of this cross in the sky before the defeat of Athelstane by the Picts and Scots.

Andrew I., the Magyar King of Hungary, son of Ladislas the Bald. He came to the throne in 1046, after the defeat of Peter, and promised his subjects to abjure Christianity. As he did not keep his word, a revolt followed, and he is said to have been killed by his brother Bala in 1059.

Andrewes, LANCELOT, Bishop of Winchester, was born in 1555. He received his education at Merchant Taylors' School and at Cambridge, and was ordained in 1580. He was made Vicar of St. Giles, Cripplegate, and chaplain to Queen Elizabeth, and then became Prebendary of St. Paul's, and of Southwell, and master of Pembroke Hall, Cambridge. James I. employed him to confute, in a work entitled *Tortura Torti*, the attacks of Bellarmine on royal supremacy. His reward was the Deanery of the Chapel Royal, and of Westminster, and presently he was appointed successively Bishop of Chichester, Ely, and Winchester. He was one of the translators of the Bible, being especially charged with the Pentateuch and part of the historical books. As a preacher he enjoyed a deservedly high reputation, and his devotional works and theological treatises still find appreciative readers. He died in 1626, and was buried in St. Saviour's Church, Southwark, where his monument and effigy may yet be seen.

Andrews, ST., a town in the county of Fife, 40 miles from Edinburgh, on the east coast of Scotland, overlooking the bay of the same name from the summit of a steep cliff. It was made a royal burgh in 1140, and Bruce held his first parliament here in 1309. The university was founded in 1411 by Bishop Wardlaw, and is the oldest in Scotland. Cardinal Beaton was assassinated in the castle (1546), the ruins of which remain; and the walls of the cathedral, wrecked by Protestants under John Knox, in 1559, add picturesque beauty to the town. The see, which lapsed in 1689, was reinstituted in 1844. The Madras School is a noble foundation, originating in a bequest of Dr. Bell for the free instruction of the poor. St. Andrews is a great resort of golf players, and sea-bathing attracts many summer visitors. The port is dangerous, and there are few industries save fishing and sail-cloth making. Population (1901), 7,621.

Andria, a town in the Terra di Bari, Italy, said to derive its name from the caverns (*antra*) that surround it. It is the seat of a bishopric, and has a fine cathedral, founded in the eleventh century. The neighbourhood produces large quantities of almonds.

Andrieux, FRANÇOIS GUILLAUME JEAN STANISLAS, born in 1759. As a member of the Council of Five Hundred (1798) he acted with moderation and independence. In 1802 he was ousted by Napoleon from the Tribunat. He now devoted

himself wholly to literature, and in 1829 he was chosen perpetual secretary of the Academy, and he died in harness four years later. Among his sixteen plays, *Les Etourdis*, *Le Trésor*, and *La Comédienne* are the best known. His stories in prose and verse met with much success.

Androcles, or ANDROCLUS, a slave, the hero of a somewhat mythical story, which says that, escaping from his master, he took refuge in a cave, where he met a lion, and extracted a thorn from the animal's foot. He was afterwards captured and thrown into the arena at Rome as a prey to the wild beasts. The particular lion that was to devour him turned out to be his old acquaintance. Instead of bloodshed there ensued mutual caresses, and Androcles was set free. Aulus Gellius is our only authority for this story.

Andromache, daughter of Eetion and wife of Hector, the Trojan hero. Her parting with her husband when he went forth to meet his fate is the most touching passage in Homer's *Iliad* (bk. vi.). After Hector's death and the murder of her son Astyanax, she became the slave of Pyrrhus, who took her to Epirus and married her, but presently gave up both his wife and his kingdom to Helenus, a son of Priam. Both Euripides and Racine made her sad career the subject of tragic dramas.

Andromeda, daughter of Cepheus, King of Æthiopia, and of Cassiopeia. The latter disputed the palm of beauty with the Nereids, and thus provoked Poseidon, who sent a sea-monster to devastate the realms of Cepheus. Andromeda was chained to a rock as a propitiatory victim, but Perseus slew the brute, rescued the princess, and was rewarded with her hand. Andromeda after death was, like her mother, enrolled amongst the constellations.

Andronicus, LIVIUS, a Tarentine Greek, who was brought to Rome and manumitted by Livius Salinator. He wrote the earliest Latin comedies of which we have any knowledge, and is reported to have translated the *Odyssey*. Nothing remains of his works but a few lines. Date, about 240 B.C.

Andronicus I., COMNENUS, the last of his family that reigned at Constantinople. Being appointed guardian of Alexis II. he killed his ward and usurped the throne, 1183 A.D. His subjects were soon disgusted with his crimes and excesses, and in 1185 put him to death.

Andronicus of Cyrrhus, a Greek astronomer, who is said to have built the Temple of the Winds, at Athens, about 100 B.C., and to have invented weathercocks.

Andros (modern *Andro*), the most northern island of the Cyclades in the Greek Archipelago. It is 25 miles long by 10 broad, and though mountainous has fertile valleys producing corn, fruit, wine and silk. The capital is a port on the S.E. bearing the same name.

Andujar, a town in the province of Jaen, Spain, on the right bank of the Guadalquivir. The convention of Baylen was signed here in 1808; and in 1823 the Duc d'Angoulême, commanding the French force sent to help Ferdinand VII., issued hence a famous but fruitless decree.

Anemometer, an instrument for measuring the velocity or pressure of the wind. Robinson's anemometer, which is the form usually employed at meteorological stations, consists of two horizontal arms crossing each other at right angles, to the ends of which are fixed hemispherical metal shells, so arranged that when the whole is supported on a pivot at the centre, the action of the wind will produce rotation, which is directly proportional to the wind velocity. Osler's anemometer registers wind pressure thus: A pencil, moved by clockwork across a sheet of paper, is made to diverge correspondingly with the pressure of the wind on a metal plate, acting through metal springs on the pencil.

Anemone, a genus comprising about seventy species of Ranunculaceous plants, native of cold

ANEMONE (*A. nemorosa*), showing flower, leaf and root.

and temperate regions. They are perennial herbs with divided radical leaves. The whole plant is very acrid. The name signifies wind flower, and several species are garden favourites.

Anemone, SEA. [ACTINIA.]

Anemophilous, a botanical term signifying pollinated by wind, applied to such plants as hazel, pines, plantains, and grasses, in which the pollen is usually very abundant, small-grained, and smooth, and is carried by wind, often on to a plumose stigma. This is facilitated in some cases by the flowers being produced before the leaves, or by lateral air bladders on the pollen grain.

Aneroid Barometer, a barometer which does not contain a liquid, but has a vacuum box nearly empty of air, and constructed for elasticity of corrugated metal, which is acted upon by the atmospheric pressure.

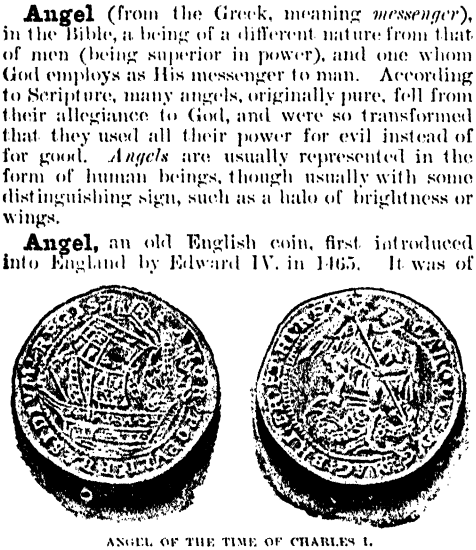
Aneurin, an ancient British bard, whose birth is fixed in 510 A.D. He was a chief amongst the Ododinian tribe, and escaped with only three others, after the battle of Cattraeth, to the court of Arthur, where he became the friend of Taliesin. He wrote a poem on the battle, and this, with his *Odes of the Months*, is all that is extant of his compositions. Some identify him with the historian Gildas.

Aneurism, or ANEURYSM, a swelling or dilatation developed in connection with an artery, either as the result of injury or from degeneration of the arterial coats. The most characteristic phenomenon presented by an aneurismal tumour is its expansile pulsation in correspondence with the heart beat. Aneurisms may give rise to distressing symptoms by reason of the pressure they exert upon neighbouring structures; and again, they may gradually increase in size, and finally rupture, leading to the pouring out of blood, either on the surface of the body or internally. A not uncommon seat of aneurism is the popliteal artery in the ham, and the main arterial trunk of the body, the thoracic aorta, is also, unfortunately, at times involved. If the aneurism be in an accessible situation, the plan of treatment usually adopted is to cause the dilatation or sac to become filled up by the deposit of fibrin from the blood, either by tying or compressing the artery somewhere between the heart and the seat of disease. This is, of course, a matter of impossibility in the case of aneurisms of the aorta. Even in them, however, a cure is sometimes effected by means of drugs, or the adoption of what is known as Tuffnell's treatment, the main features of which are absolute rest and restriction of diet, particularly as regards fluids.

Angakok, ANGEKOK, an Eskimo wizard who professes to act as a medium of communication between the supernatural powers and mankind. The angakoks claim to derive their knowledge of future events, treatment of disease, etc., from a familiar spirit who is summoned by beating a drum.

Angel (from the Greek, meaning *messenger*), in the Bible, a being of a different nature from that of men (being superior in power), and one whom God employs as His messenger to man. According to Scripture, many angels, originally pure, fell from their allegiance to God, and were so transformed that they used all their power for evil instead of for good. *Angels* are usually represented in the form of human beings, though usually with some distinguishing sign, such as a halo of brightness or wings.

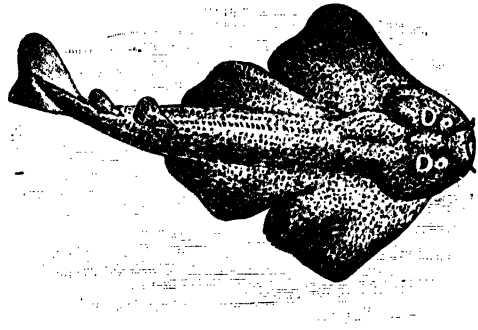
Angel, an old English coin, first introduced into England by Edward IV. in 1465. It was of



ANGEL OF THE TIME OF CHARLES I.

gold, and represented on one side the conflict between Michael and the Dragon. The last angel struck in England was in Charles I.'s reign. The value of the coin varied from 6s. 8d. to 10s. at different periods.

Angel-fish (*Rhina squatina*), a viviparous fish belonging to the sharks, constituting a family and ranging over tropical and temperate seas from Britain to California and Australia. It approaches the rays in form and habits; the length does not seem to exceed five feet; sandy-grey above, white beneath; head and body depressed; pectoral fins large, with the basal part prolonged forward (from



ANGEL-FISH (*Rhina Squatina*).

the fancied resemblance of these fins to wings, the popular name is derived); immediately behind these are the broad ventral fins; two dorsal fins on the tail. It is abundant in European waters, concealing itself in sandy bottom, and preying on the flat-fish. Its flesh is sometimes used for food, but is coarse, and has an ammoniacal smell. The rough skin is used for polishing purposes, and to make a kind of shagreen.

Angelica, a genus of umbelliferous plants. The leaf stalks of *A. Archangelica* are candied as a sweetmeat, and the seeds are one of the ingredients of the liqueur chartreuse.

Angelica, OIL OF, an essential oil obtained from the seeds of the *Angelica archangelica*; it contains a terpene ($C_{10}H_{16}$). B.P. 175° C. S.G. ·833.

Angelico, FRA GIOVANNI, DA FIESOLE, a celebrated Italian painter, was born at Murgello, in 1387. He joined the Dominican order of monks at Fiesole, and dedicated his artistic talent to the service of religion, never taking his brush in hand without prayer. Having covered with frescoes the walls of his monastery, he was called to Rome by Nicholas V. to decorate the chapel of the Vatican. His pictures are remarkable for delicacy and finish; the heads of his saints and angels being inspired with superhuman grace and beauty. Two of his finest works, *The Marriage of the Virgin* and *The Coronation of the Virgin*, are amongst the most valued treasures of the Florentine gallery. An excellent example, *The Resurrection*, is to be seen in the National Gallery, London. He died in 1455 at Rome.

Angelo, MICHAEL, BUONAROTTI (sometimes written MICHELANGELO), who stands in the forefront of Italian artists as painter, sculptor, and

architect, was born of a good Tuscan family in 1474. In childhood the bent of his genius showed itself, and he was early apprenticed to Ghirlandajo, whom he soon surpassed. However, under the encouragement of Lorenzo de Medici he turned his attention to sculpture—for oil painting he always had a certain contempt—and worked for several years in the Medici Palace. In 1496 he visited Rome and produced his *Sleeping Cupid* and the Pieta that still stands in St. Peter's. Returning to Florence (1501) he carved the colossal David, and in 1505 designed the cartoon of the *Surprise of Pisan Soldiers while Bathing* to match a decoration by Leonardo da Vinci in the Council Hall of Florence. He settled in Rome in 1508 with a view to making a mausoleum for Pope Julius II. It was then that he painted the ceiling of the Sistine chapel, his masterpiece in that branch of art, whilst he executed the statue of Moses for the tomb of Julius —perhaps his noblest work in sculpture. From 1513 to 1525 he appears to have lived in Florence engaged on the Laurentian library, the Medici chapel, and the mausoleum of the family, where his famous figures *Night* and *Morning* are to be seen. At the request of Clement VII. he began in 1533 the great fresco of *The Last Judgment* on the altar wall of the Sistine chapel, and he was appointed by Paul III. to the complete charge of the Vatican. In 1547 he became architect of St. Peter's, designed but did not complete the dome, and spent the remainder of his days in rebuilding and improving that splendid structure. He died in 1564, and was buried in Santa Croce at Florence. He never married, but the story of his love for Vittoria Colonna is well known. In addition to his other great talents Michael Angelo possessed in no small degree the gift of poetry.

Angelus, the name given to a bell which in Catholic districts is rung three times a day to invite people to repeat the prayer known as the *Angelus*. It gives the title to a picture by Millet.

Angelus, SILESIUS, a German poet and theologian, born at Breslau in 1624. Originally a Protestant, and physician to the Duke of Wurtemberg, he embraced Romanism, and entered the priesthood. He died in 1677.

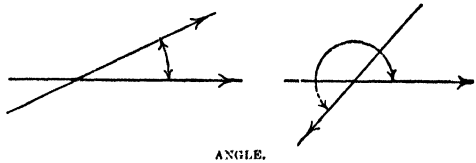
Angermann, a river of Sweden which rises in the Kiölen Mountains (lat. 65° 59′ N., long. 15° E.) and flows S.E. into the Gulf of Bothnia, having Hernoesand at its mouth. A province of Norland takes its name from the river.

Angers (anc. *Andecavia, Andes,* or *Juliomagus*), a very ancient city of France, 160 miles S.W. of Paris, on the river Maine, which divides it into two. Formerly the capital of Anjou and now of the department of Maine-et-Loire, Angers was an important place in Roman times, possessing an amphitheatre, the ruins of which still exist. It is the seat of a bishopric, and before the Revolution had a famous university and also a military school, where the Earl of Chatham and the Duke of Wellington were students. The cathedral, dedicated to St. Maurice, dates from 1225. There are slate quarries in the neighbourhood which employ over 3,000 men, and camlets, serges, hats, and leather goods are among the staple manufactures. A large trade is done in corn, wine, and agricultural products. David, the sculptor, was born here.

Angina, a term derived from a Greek word meaning to strangle. Angina was used by the ancients to signify an inflammation of the throat or air passages attended by difficulty of breathing or swallowing. It is still used at times in this sense, as in the expression angina faucium, which is sometimes used in speaking of quinsy. The most common use of the word is, however, that which obtains in angina pectoris. *Angina pectoris* was the name given by Heberden to a peculiar form of neuralgia, in which pain occurs in the heart region, extending at times to the left shoulder and even down the left arm. The attacks come on quite suddenly, the patient appearing to be in extreme distress, and suffering the most acute agony. The subjects of angina are usually over fifty years of age, and are much more frequently men than women. The duration of the seizure is from a few seconds to several hours, and death may terminate the attack. Angina has been attributed to a cramp of the muscle of the heart, or to a spasm of the muscles of the small arteries. Much relief is at times afforded during the attacks by the inhalation of nitrite of amyl.

Angiosperm (Greek, *aggeiŏn*, a vessel, or closed receptacle), a botanical term applied to all those flowering plants in which the seeds are enclosed by the carpels in an ovary, as opposed to the gymnosperms, or naked-seeded plants. The *Angiospermia* form the larger and higher division of the sub-kingdom *Phanerogamia*.

Angle between two lines, the amount of rotation required to bring a line from one position to the other, regard being taken of the "sense" or direction which the bounding lines are understood to possess. If two lines are parallel and drawn in the same sense no rotation is necessary, hence the angle



ANGLE.

between them is zero. Angles are measured in (*a*) *Sexagesimal* measure. A complete rotation is called four right angles.

1 right angle = 90 degrees (°).
1 degree = 60 minutes (′).
1 minute = 60 seconds (″).

(*b*) *Centesimal* measure.

1 right angle = 100 grades (gr.).
1 grade = 100 French minutes ( ).
1 Fr. min. = 100 French seconds ( ).

(*c*) *Circular* measure. By the ratio of the circular arc subtended by the angle to the radius of the arc, a ratio found to be constant for any ratio if the angle is constant.

Angler-fish (*Lophius*), a genus of Pediculati (in which the carpal bones are prolonged, so as to form a sort of arm terminating in the pectoral fin),

called also fishing-frog, frog-fish, or sea-devil (from its ugliness and voracity). There are four species, identical in habits. One (*L. piscatorius*) is British, which attains a length of five feet, and specimens of three feet are common. The head is very broad, and the body tapers rapidly to the tail; the pectoral and ventral fins are articulated so that

ANGLER-FISH.

the fish can walk on the bottom of the sea, where it generally hides in sand or seaweed. Round the head and body are numerous appendages like short fronds of algæ, and there are three long filaments on the head, the anterior one being movable in all directions. The angler uses the appendage as a bait, attracting other fishes, which when sufficiently near are swallowed at a gulp.

Anglesea, or ANGLESEY (*The Island of the English*), an island and county on the north-west coast of Wales, separated from the mainland by the Menai Strait, which is, however, now crossed by the tubular and suspension bridges. The island is 21 miles long and 19 broad; its area being 193,511 acres. The soil is fertile, the surface flat, and the climate mild. The copper mines, which were at one time very considerable, were discovered in 1768; the island yields also lead, ochre, and a little silver. The principal towns are Beaumaris, the capital, Holyhead, and Amlwch. The agricultural products are wheat, barley, oats, rye, and potatoes; cattle and sheep are raised to a large extent.

The Roman name for the island was Mona, and the remains of a Roman camp still exist at Holyhead. This latter town is a place of importance, as it forms the point of departure of the boats for Ireland. The suspension-bridge is a magnificent structure, 580 ft. from pier to pier, and 100 ft. above high-water mark. Anglesey returns one member to Parliament. Pop. (1901), 34,808.

Anglesey, HENRY WILLIAM PAGET, 1st Marquis of, the eldest son of the first Earl of Uxbridge, born in 1768. He entered the army early, and in 1793 raised a regiment among his father's tenantry, which later on became the 80th foot. As lieutenant-colonel of this corps he did excellent service in Holland (1794) and in the Peninsula (1809). In 1812 he succeeded to the earldom. At Waterloo he led the final charge, and lost a leg from a wound in the knee. He was created a marquis, and was also honoured with the Grand Cross of the Bath. He became Master-General of Ordnance in 1827, and Lord Lieutenant of Ireland in 1828, but was forced to resign because he favoured Catholic Emancipation. He died in 1854.

Anglesite, named from Anglesey, is the sulphate of lead ($PbSO_4$), crystallising in rhombic prisms, white, adamantine, soluble, and more than six times the weight of water. It results from the oxidation of galena (PbS), and when abundant, as in Australia, is a valuable ore of lead.

Anglia, EAST, the kingdom founded by the Angles, a German tribe who crossed over from their native Angeln in the 6th century, and with their kinsmen, the Saxons and Jutes, established themselves in East Anglia, Northumbria, and Mercia. Norfolk and Suffolk now occupy the district.

Anglican, belonging to the Church of England, or the Protestant episcopal churches in Scotland, Ireland, or the colonies. The term is used of the High Church section of the Church of England.

Angling. [FISHING.]

Anglo-Catholic, a term formerly used in much the same sense as Anglican (q.v.).

Anglo-Israelite Theory, the view that the English people are descendants of the lost ten Tribes, recently made prominent by the writings of Edward Hine and Philo-Israel; but hopelessly at variance with linguistics, ethnology, and historical evidence.

Anglomania, the desire among people of another race to imitate English manners, customs, or institutions. Germany, France, and the United States have all been affected with Anglomania at various times and in varying degrees.

Anglo-Saxon, originally a substantival term used only in the plural as a collective name for the Saxon invaders of Britain as distinct from the Saxons on the continent of Europe. It appeared first in a Latin form, and the earliest example of its use which has come down to us dates from the eighth century. From the ninth to the eleventh centuries inclusive the name was sometimes applied to the whole body of Teutonic invaders, and occurs, though very rarely, in old native documents, and somewhat more commonly in Latin ones. But it was always a term of formal description, and never employed by the people, who, when they did not speak of themselves as *Angles*, *Jutes*, and *Saxons* respectively, called themselves *English*. *Saxon* was the word used by the displaced Celts to denote any of the Teutonic invaders, and it had been used by the Romans in an almost identical sense centuries before. Freeman asserts that the opposition between *Norman* and *Anglo-Saxon*, commonly made by modern writers, is not found in contemporary documents. At the Conquest the native race was called *English* by the Norman invaders, while down to the 12th century *Saxon* and *Anglo-Saxon* were applied indifferently by the Latin chroniclers to the English of the period before Senlac as distinct from the nation formed by the union of the English and the Normans.

The term then fell into disuse till it was revived

in the 16th century by Camden to denote the English Saxons and the Old English tongue in its inflected stage. This use continued till early in the second half of the 19th century, when a vigorous attempt was made—notably by Palgrave, Freeman, and Green—to banish the term and to substitute for it what they considered to be the correct expression—*English*. Freeman says: "Our tongue has always been called *English* as far back as we can go; so that it is better to call it English at all times, and, when needful, to distinguish the older form as *Old English*, than to talk, as many people do, about *Saxon* or *Anglo-Saxon*, which makes people fancy that one language has been changed for another." Despite this weight of authority, the name *Anglo-Saxon* is firmly fixed in the language. Professor Skeat is of opinion that it should be retained as being generally understood. "Besides, it has a special technical sense—the old Southern dialect of Wessex. It does not in the least follow that the people of ancient England, or even of the South of it, ought to be called *Anglo-Saxons*. They should be called *English*."

But it is of little consequence which name is used in speaking of the language prior to 1100, for the literary remains which have come down to us from before this date are almost all in the Southern or Wessex dialect, to which the name Anglo-Saxon is specially applied, so that the dispute is one about names, rather than things. The examples which we possess of the Mercian or Midland dialect are chiefly in the form of glosses on Latin texts, while those of the Northumbrian or Northern dialect are similar glosses, and a few fragments of poetry. As the subject will be fully treated under ENGLISH LANGUAGE AND LITERATURE, it will be sufficient to say that the English of the first period was a highly inflected language, having grammatical gender, declension of nouns, adjectives, and pronouns, these last with a dual number expressive of two and no more, the plural being reserved for more than two. Of late years the study of Anglo-Saxon has greatly increased among English-speaking peoples, though some of the best books on the subject have been written by Germans, and in the German language. The example given below is from an Anglo-Saxon version of St. Matthew (xiii. 3–5) of the tenth century, quoted by Prof. Skeat in his *Principles of English Etymology*, with his literal rendering:—

Sóþlice út éode se sáedere his sáed tó sáwenne.
Soothly out went the sower his seed to sow.

And þá þá hé séow, sume híg féollon
And when that he sowed, some they fell

wiþ weg, and fuglas cómun and éton
with (= by the) way, and fowls came and ate

þá. Sóþlice sume féollon on stáenihte,
them. Soothly some fell on stony-ground,

þǽr hit nǽfde micle eorþan and hrædlice up
where it had-not much earth, and quickly up

sprungon, for þám þe hig nǽfdon þǽre eorþan
sprang, for that that they had-not of-the earth

dýpan.
depth.

Angola, a country on the west coast of Africa, extending from Cape Lopez de Gonsalvo to St. Felipe de Benguela. The name applies to all the Portuguese W. African possessions from the Congo to the Cunene. The Portuguese explorer, Diego Cano, discovered the coast in 1484. The native name for the district is *Dongo*. Near the sea the land is flat and barren, but the interior is mountainous with rich and well-watered valleys, the chief rivers being the Kwango, Cuanza, Bengar, and Danea. Owing to elevation and the prevalence of the trade winds the climate is fairly healthy. Gum, wax, ivory, sugar, millet, rice, yams, mandioc, and fruits are the chief produce, and considerable mineral wealth must exist. The capital is St. Paul de Loanda, built 1578.

Angora (anc. *Ancyra*, Turk. *Inkhirè*), an ancient inland city of Anatolia, Asiatic Turkey, situated on a river known in early times as the Sangarius, now Sakaria, and giving its name to a village. Greek and Roman remains abound in the neighbourhood, and the ruins exist of the splendid marble temple built in honour of Augustus. An inscription, purporting to be his testament, was found engraved on the columns. It was the seat of an early Christian Church, founded perhaps by St. Paul, and councils were held there in 314 and 358. Tamerlane defeated Bajazet near this spot (1402) and imprisoned him in an iron cage. The Turks have had possession of Angora since 1416. The chief trade of the place consists of the fine wool or outer coat of the Angora goat. Cats and rabbits having the same long silky fur are named from the town.

Angora Goat. [GOAT.]

Angostura, the capital of the province of Guyana, Venezuela, S. America (also known as Ciudad Bolivar). It is situated on the right bank of the Orinoko, about 240 miles from its mouth. In 1819 a congress was held here under Bolivar, by which New Grenada and Venezuela were united to form Columbia. Sugar, cocoa, cotton, hides, and bark are largely exported.

Angostura Bark, the bark of *Galipea Cusparia*, a member of the order *Rutaceæ*, native to Venezuela, containing an alkaloid, *angosturine*, employed in cases of dysentery.

Angostura Bitters, a tonic containing angostura bark, canella, and other aromatics.

Angoulême (anc. *Inculisma*), a very old city of France, now the capital of the department of Charente, and situated on the river of that name. In communication with the sea, and on the main line from Paris to Bordeaux, Angoulême is an important centre of trade. The chief local manufactures are serges, earthenware, paper, and gunpowder. The Cathedral dates from 1120. Amongst the distinguished natives were Balzac, Ravaillac, and General Montalembert. The county or duchy of Angoulême is almost coterminous with the province of Angoumois. The first Count of Angoulême and Perigord was created in 866. The male line ended in 1181, when the fief went by marriage to the De Lusignans. At the end of the 14th century it

was conferred on Louis, Duke of Orleans, from whom sprang Francis I., and the house of Valois-Angoulême. It was then made a duchy, and was held by members of the royal family till 1650, after which the title ceased to have territorial value.

Angoulême, Louis Antoine de Bourbon, Duc d', the eldest son of the Comte d'Artois (Charles X.), born in 1775. During the period of the emigration he married Marie Thérèse, daughter of Louis XVI., called by Napoleon "the only man in the family." Returning to France in 1814 he vainly opposed the movements of Napoleon on his escape from Elba, and was taken prisoner by Grouchy, but released. In 1823 he led an army into Spain for the support of Ferdinand VII., and succeeded in re-establishing the royal authority, and issued the decree of Andujar, though intrigues counteracted the full effect of his policy. After the revolution of 1830 he made over his rights to the Duc de Bordeaux, and assuming the title of Comte de Marnes, lived in retirement until 1844.

Angra, the chief town of the Azores, on the Island of Terceira, in possession of Portugal. The port is a small arsenal and is well fortified. There is some trade in wine, flax, cheese, fruit, etc.

Angra-Pequena, a German settlement on the coast of Namaqua Land, south-west Africa, to the north of the Orange river, which is the boundary of Cape Colony. The German claims extend about 150 miles from the Orange river without any precise limitation inland. The colony is now known as Luderitz Land, from the name of the adventurer who, in 1883, purchased the soil from a native chief.

Angström, Anders Jonas, a Swedish physicist, born in 1814, after holding several minor appointments in the University of Upsala, became professor of physics in 1858. He wrote on heat, magnetism, and optics, but his most valuable contributions to science relate to the spectroscope. In the *Recherches sur le Spectre Solaire* (1869) he carried forward Kirchhoff's great discovery, and he investigated the spectra of gaseous substances. He died in 1874.

Anguilla, or Snake Island, is one of the British West Indian Islands, in the Leeward group. It has an area of 35 square miles. The name is derived from its sinuous shape. There is a good harbour.

Anguillulidæ, a family of nematode worms. They are rarely parasitic, but usually live on plants, in water or damp earth. They are also common in fermenting or putrefying matter; thus, *Anguillula aceti* or "vinegar eels" occur in cheap vinegar that has gone bad; *A. glutinis* in sour paste, etc.

Anguineum, a Druidical charm or amulet.

Anhalt, a German duchy, surrounded and split up by Prussian Saxony. The Hartz Mountains push into its western districts, but the rest is flat and woody, and watered by the Elbe and Saale. The four towns of Dessau, Bornberg, Köthen, and Zerbst supply names to the divisions of the duchy, Anhalt-Dessau being the chief. Woollen goods, pottery, and hardware are manufactured, but the country is almost entirely agricultural. Area, 869 square miles.

Anhydride, an oxide which combines with water to form an acid. Anhydrides may therefore be regarded as acids deprived of water, the latter being essential for the exhibition of those properties which are characteristic of acids. Thus, a solution of an anhydride in ether, or some other non-aqueous solvent, is not capable of reddening litmus paper [Ex. Sulphuric anhydride, which combines with water to form sulphuric acid ($SO_3+H_2O=H_2SO_4$].

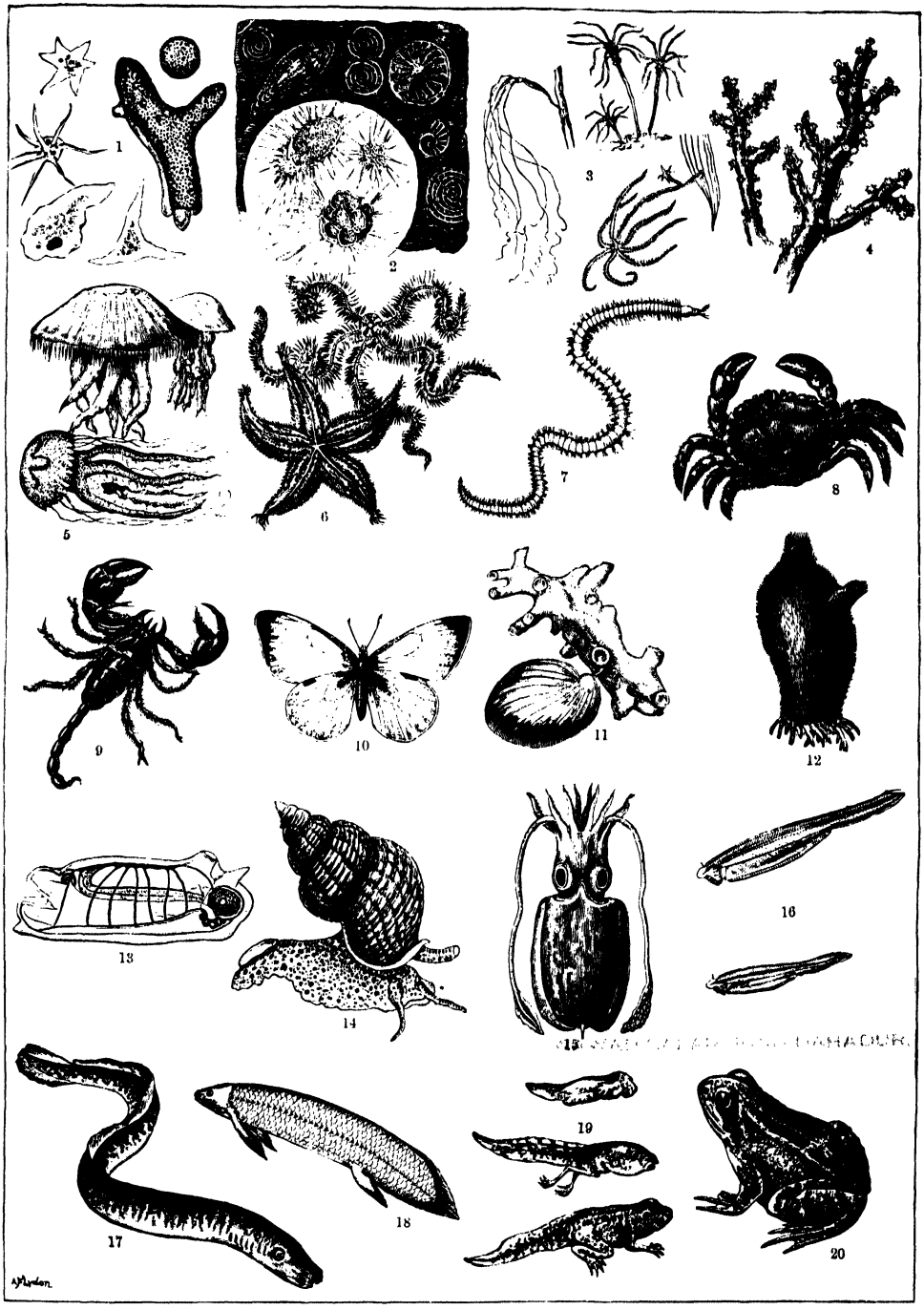
Anhydrite, or Karstenite, the anhydrous sulphate of lime ($CaSO_4$), so called in contradistinction to gypsum, the hydrous sulphate ($CaSO_4+2H_2O$). Like most anhydrous sulphates, anhydrite crystallises in the prismatic system. It is much harder and slightly heavier than gypsum, is white and translucent, and occurs in beds associated with gypsum and rock salt.

Ani. [Savannah Blackbird.]

Anidrosis, the condition of deficient excretion of sweat.

Aniline, or Phenylamine ($C_6H_7N=C_6H_5NH_2$). First isolated in 1826 by Unverdorben, who prepared it from indigo. Its preparation from the distillation products of coal and its resources as a colouring matter were of much later discovery. Within the last twenty years aniline has acquired an immense importance in the dyeing industry, which it has completely revolutionised. Aniline is usually prepared by reducing nitro-benzine with ferrous acetate; it is a colourless and transparent oily liquid. B.P. 182° C., S.G. 1·028; slightly soluble in water, but dissolves in all proportions in alcohol, ether, and most organic solvents. Combines with acids to form salts. The discovery of the first aniline colour, *Aniline-Purple* or *Mauve*, was made by Perkin in 1856; and *Rosaniline* or *Magenta* was isolated by Hofmann two years later. Since then, by treating aniline with various reagents a wonderful range of colours has been obtained of every conceivable hue.

Animal Heat, the heat produced in animal bodies as the result of the processes of chemical decomposition which take place in them. The oxygen absorbed by the lungs in combining with certain elements, and again, the food in undergoing certain changes within the body, are mainly accountable for the heat evolved. In some animals, which are therefore called warm-blooded, the temperature of the body only varies within very narrow limits. Thus the body temperature in man, whether he dwell at the equator or in the arctic regions, never deviates in health far from the standard, which is 98·6° F. It is usually somewhat higher in the afternoon, and falls to its lowest point in the early morning; again, it rises a little after food or exercise. Cold-blooded animals, however, do not possess this power of maintaining a constant body temperature. Indeed, their temperature differs but little from that of the



ANIMAL KINGDOM.—I.

1 Amœba. 2 Foraminifera. 3 Hydra. 4 Coral. 5 Jelly-fish. 6 Star-fish. 7 Nereis. 8 Crab. 9 Scorpion. 10 Butterfly. 11 Lamp-shell. 12 Ascidian. 13 Salpa. 14 Whelk. 15 Cuttle-fish. 16 Amphioxus. 17 Lamprey. 18 Menobranchus

medium, whether air or water, in which they live. Roughly speaking, among vertebrates mammals and birds belong to the class of warm-blooded, and fish, reptiles, and amphibia to that of cold-blooded animals. The regulation of the body heat in those animals whose temperature remains constant is largely effected by variations in the amount of heat given out. Thus in a warm atmosphere the capillaries of the skin are dilated, and much heat is lost by perspiration, while the exposure to cold air produces a diminution of the blood supply to the skin and a consequent diminution in loss of heat. But a second factor which is concerned in maintaining a constancy of temperature is variation in the amount of heat produced. The parts of the body in which chemical changes resulting in heat production are most active are the muscles, the liver, and the brain. The kind of food again has an influence in this matter. Fats are eminently heat giving foods, and it is noteworthy that much fat is consumed by dwellers in cold or temperate regions, while it is avoided as an article of diet in tropical countries.

Animal Kingdom, a term of comparatively recent introduction, the exact extent of which it is impossible to define, and for which it would be well to substitute the term "organic kingdom"—embracing all organisms, animal or vegetable, as distinct from the inorganic world. The Linnæan aphorism, "Stones grow; plants grow and live; animals grow, live, and feel," is ambiguous; for, as Professor Huxley points out, "the word *grow*, as applied to stones (*i.e.* minerals), denotes a totally different process from what is called *growth* in plants and animals." The growth of minerals is effected purely by the external addition of new matter, as may be observed in crystals; the growth of the other two is the result of a process of molecular intussusception—the interposition of new molecules between those already existing—to such an extent that the process of reconstruction is more rapid than that of disintegration. Then the chemical constitution of living matter, which, in its primary unmodified state, is known as protoplasm (q.v.), distinguishes it absolutely from all other kinds of things, and the present state of knowledge furnishes us with no link between the living and the not-living. Moreover, an individual living body is constantly changing its substance by waste and reconstruction, and its size and form undergo continual modifications, ending in decay and death; while the perpetuation of the species is secured by the detachment of portions that tend to run through the same cycle as the parent form. Thus it is easy to distinguish animals and plants from inorganic bodies. One of the results of modern biology is the conviction that there is essential unity between all living organisms; and traced down to their lowest terms the series of plant forms gradually lose more and more of their distinctive features, while the series of animal forms part with more and more of their distinctive animal characters, and the two converge to a common term. Professor Jeffrey Bell thus enumerates the points of differences between animals and plants:—

1. The form of an animal is oblong and rounded; that of a plant diffuse and arborescent.
2. An animal requires albuminoid foods; a plant lives on carbonic and mineral salts.
3. In all but the lowest animals there is a distinct mouth; plants take in food by the porous tissues.
4. Some of the waste products of an animal always contain nitrogen; the secretions of a plant are non-nitrogenous.
5. Animals are locomotive; plants are fixed.
6. The wall of an animal cell is derived directly from the cell protoplasm; the cell-wall of plants is formed by cellulose.

To nearly all these statements, however, exceptions may be found.

1. Polyps are arborescent or diffuse; cacti and fungi are not.
2. Fungi appear to require a more complex compound than carbonic acid and mineral salts.
4. Though plants do not give off nitrogenous excreta, their protoplasm is capable of forming them.
5. Polyps and many of the stalked Echinodermata are fixed; Volvox (q.v.) is locomotive.
6. The Cilio-flagellata have cellulose in the cell-wall, while some of the lowest plants have their protoplasm naked.

This list—imperfect as it is—will serve to show the broad general characteristics of animals and plants; but it must be borne in mind that sensibility appears not to be an exclusive animal characteristic [SENSITIVE-PLANT], and that some (the sun-dews and Venus's fly-trap) have the power to absorb and digest animal matter. [INSECTIVOROUS PLANTS.] For forms which stand as it were upon the border of these two groups of organisms, it has been proposed by Häckel to erect a third group, Protista (q.v.). The classification adopted in this book is as follows:—

Sub-Kingdom I.—Protozoa.
" II.—Metazoa.
(*a*) Cœlenterata.
(*b*) Cœlomata.
1. Echinodermata.
2. Vermes.
3. Arthropoda.
4. Molluscoida.
5. Mollusca.
6. Chordata.

Under these heads smaller groups will be dealt with, and animals will be treated under their popular names. [BIOLOGY, EVOLUTION, GEOGRAPHICAL DISTRIBUTION, MORPHOLOGY, ZOOLOGY.]

Animal Magnetism, HYPNOTISM, MESMERISM, ELECTRO-BIOLOGY, ODYLISM, names given to a group of phenomena which are at present but little understood, and which have unfortunately received much more attention from those who have sought to employ them as a means of imposing upon the ignorant and credulous, than from earnest men studying the subject in a scientific spirit.

The title Animal Magnetism is a bad one, and was derived from the fanciful supposition that one person could influence the actions of another by means of a certain mysterious influence which was compared to that of a magnet; it is now, however, known that the phenomena are due to perverted action on the part of the subject, and not to any magnetic or mesmeric force emanating from the operator.

Of course, cures have been ascribed from time immemorial to supernatural agencies, the crowds who flocked to be "touched" for king's evil representing a survival of such notions to quite recent times; it was only, however, rather more than a

century ago that the question assumed its modern form. Frederick Anton Mesmer, who was born in 1733, and who studied medicine at Vienna, was the originator of the notion of a magnetic fluid, or influence, by means of which he declared himself capable of producing the magnetic state in others, a process which resulted in their being cured of any form of disease from which they might happen to suffer.

His treatment of patients in Paris excited much controversy, and for a time crowds flocked to him to be magnetised. About thirty people at a time were seated around what was called the "baquet" or trough, the surroundings being full of mystery, a dim light, strange odours, and the sounds of music being employed, while Mesmer himself walked about attired like a magician. Such was the attention directed to the supposed miraculous cures effected, that the French Government appointed a commission of inquiry to investigate the results. In an elaborate report which was drawn up by this body, some of the effects claimed to have been produced were admitted, but they were attributed to the working of a highly wrought imagination in susceptible subjects, rather than to any magnetic influence.

No more light was thrown upon the question until Braid, a Manchester surgeon, commenced to study the subject in 1841. This observer showed that the mesmeric sleep could be produced by inducing exhaustion of the retina and eye muscles by causing the subject to gaze in a constrained position at some bright object. He employed his method in several forms of disease, and published a series of observations on the use of hypnotism as a curative agent. His work was a great advance on that of previous experimenters, as he did not attempt to throw any halo of mystery around what he did.

Heidenhain of Breslau, Charcot at the Salpêtrière in Paris, and Liébault of Nancy are the most recent serious workers in the same field, all these observers of course denying that there is any marvellous element in the phenomena of hypnotism. The ordinary phenomena witnessed in the hypnotic state are as follows:—The condition is produced usually by prolonged gazing at a bright object, some observers attaching importance to the "passes" made with the operator's hands. After a time a kind of sleep is induced, which differs from ordinary sleep in that the subject will respond to "suggestions" made by the operator. Thus he may be made to drink castor oil under the impression that it is a refreshing beverage, and to perform many other anomalous actions, for the most part of an exceedingly useless nature. In spite of the trivial character of many of the experiments—and the practice of hypnotism seems to be inevitably associated with an element of practical joking—there can be no doubt that in suitable subjects these phenomena of suggestion are occasionally genuine.

It is claimed that by suggesting to a paralysed man that he can walk, or by suggesting to a drunkard that he should avoid alcohol, and the like, much good may be done; it is needless, however, to observe that no *organic* disease was ever cured by hypnotism; the patient's trouble must be one of moral weakness, or his disease of a hysterical, or to use less objectionable terms, neuromimetic or functional character, for him to obtain any benefit from suggestion. Again, the marvel, if marvel there be, lies in the patient and not in any mysterious influence exerted by the operator; and moreover the existence of cures of this description is no new thing. Moral influence wrought the cure of functional disease long before Mesmer ever conceived the idea of magnetic influence.

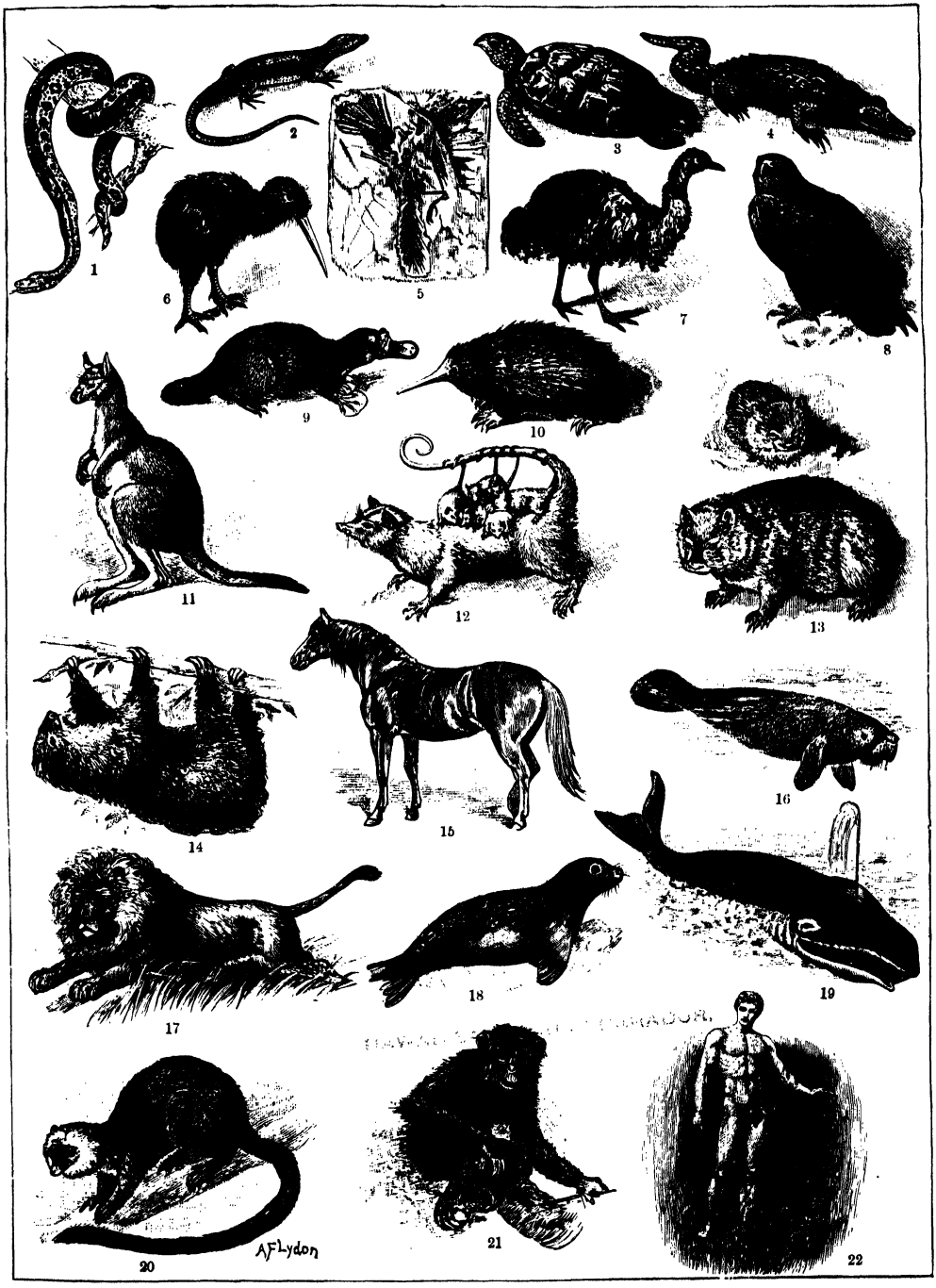
A curious class of phenomena observed in the hypnotic state are the rigidities of body and the way in which muscles will maintain a condition of contraction impossible in the ordinary conscious condition. Again, certain abnormalities of sensation may be present: anæsthesia is common, colour blindness may occur, and so on. All these phenomena are familiar enough apart from hypnotism, nevertheless some interest attaches to their mode of development and to the changes which can be rung upon them in suitable subjects.

Charcot's followers have gone so far as to describe three different states of hypnotism: lethargy, catalepsy, and artificial somnambulism; hitherto, however, this classification has not been accepted by other observers.

It may be taken for granted that most people can be hypnotised, provided they submit themselves to the extremely exhausting process described by Braid. After a time the hypnotic state comes, it is said, to be quite readily assumed, and in a small proportion of people this may be the case from the first; particularly does this seem to hold in France. The net result of experiments hitherto made seems to be, however, that in submitting to the process a very undesirable susceptibility may be induced, and the benefits claimed to accrue from suggestions made in the hypnotic state cannot be said to rest on any secure foundation of well-ascertained fact.

Animal Mounds. [MOUNDS.]

Animal Worship, or adoration paid by man to any of the lower animals, probably arose from the want of distinction in the savage mind between the soul of a human being and that of a brute, and was strengthened by the later doctrine of metempsychosis. It is a distinct stage in religious development, and its different forms may be conveniently grouped under three heads: (1) The beast was worshipped as being possessed of greater power, skill, or cunning than its worshippers, and propitiated by offerings and ceremonies as, for example, by Kamtchadales, who worshipped the bears and wolves that could devour them and the whales that could overturn their boats; (2) the beast was regarded as the incarnation of some deity or spirit—this form prevails extensively in India, where, says Tylor, "the sacred cow is not merely to be spared, she is a deity worshipped in annual ceremony, daily perambulated and bowed to by the pious Hindu, who offers her fresh grass and flowers" [AVATAR]; and (3) it was raised to the rank of a tribal ancestor, and all animals of the same kind were thenceforward deemed sacred, as was the case in ancient Egypt, where many of the



ANIMAL KINGDOM.—II.

1 Boa. 2 Lizard. 3 Turtle. 4 Crocodile. 5 Archæopteryx. 6 Apteryx. 7 Emu. 8 Eagle. 9 Ornithorhyncus. 10 Echidna. 11 Kangaroo. 12 Opossum. 13 Wombat. 14 Sloth. 15 Horse. 16 Manatee. 17 Lion. 18 Seal. 19 Whale. 20 Lemur. 21 Chimpanzee. 22 Man.

deities were represented wholly or partially under the forms of sacred animals; and the local character of these sacred beasts is shown by the fact that some of those worshipped and mummified after death in one district were killed and eaten with impunity in other places. [SERPENT-WORSHIP, TOTEMISM.]

Anime, a copalline or varnish resin of agreeable odour used in perfumery. It is pale brown, transparent, brittle, insoluble in water but soluble in alcohol. In Zanzibar it is obtained from *Trachylobium Hornemannianum*, in Brazil from *T. martianum* and *Hymenæa Courbaril*, in West Africa from *Guibortia copallifera*, and in Siberia from an *Icica*.

Animism, a term introduced in the eighteenth century by Stahl, a German physician, who taught that all the phenomena of physical life are controlled by an immaterial *anima*, which was only a reproduction of a classical theory; it soon fell into disuse, but has recently been revived by Dr. Tylor to denote the doctrine of spiritual beings, which embodies the very essence of spiritualistic, as opposed to materialistic philosophy. Accepting "belief in spiritual beings" as the narrowest definition of religion possible, he holds that there is no evidence of races entirely without religion, though it would be in the highest degree unwise to consider such belief instinctive or innate. The origin of animism appears to be found in the endeavours of savage races to solve the problems of life and death, health and disease, sleep and dreams, trances and visions, by the identification of soul and vital principle and the conception of the soul as a thin substantial human image, corresponding in appearance to the body it animates. This conception has never been lost: so Homer described the shade of Patroclus appearing to Achilles; so Samuel came, "an old man covered with a mantle," when called up by the witch at En-dor; Shakespeare made the ghost in *Hamlet* revisit Elsinore "in the same figure, like the king that's dead," and such is the popular conception of a ghost at the present day. But since the lower animals and inanimate objects appear in dreams, it follows—if the deduction with regard to the human soul be sound—that they too have something of the same nature, and both animal-souls and object-souls come into prominence in the rite of funeral sacrifice (q.v.). From this conception of the human soul transition to the conception of a future life was easy; and since it was believed that men retained after death the dispositions which distinguished them and the positions they held during life, the spirit world was pictured as peopled by beings of different ranks, unequal in power, and friendly or hostile to man. The doctrine of object-soul paved the way for nature-worship, or a form of dualism (or contest between beneficent and malevolent powers); while the idea of the continuity of human life led to belief in a Supreme Deity, either as a nature-god, or as the soul of the world (as the Manitou of the Red Indians), and so a kind of monotheism was established.

Anio, or ANIENUS, the classical name of the Teverone. Rising in the Apennines it forms the boundary between the Sabine country and Latium. At Tibur (Tivoli) it descends the valley in a lovely cataract (Hor. *Od.*), and joins the Tiber about four miles above Rome.

Anise (*Pimpinella Anisum*), an umbelliferous plant native to the Levant and long cultivated in Europe for its aromatic fruits, which are known as *aniseed*. On distillation these fruits yield oil of anise, which is also obtained from fennel, tarragon, and star-anise. The latter plant is entirely distinct from the true anise, being the genus *Illicium* of the order Magnoliaceæ, and having star-shaped fruits. Aniseed is carminative, but is largely employed in liqueurs.

Anisopleura, the larger sub-class of the gastropoda (q.v.). The name implies that the symmetry of the larva is not retained.

Anisopoda (*i.e.* "feet not all similar"), a sub-class of ISOPODA, including those in which the body resembles that of the *Amphipoda*, and in which the appendages on the abdomen (the hindmost section of the body) do not serve as *branchiæ* (breathing organs). *Tanais*, one of the "Slaters," is the commonest genus.

Anjou (Lat. *Andecavi*), an ancient province of France, lying between Normandy, Poitou, Maine, Brittany, and Touraine. It is now divided into the departments of Maine-et-Loire, Mayenne, Sarthe, and Indre-et-Loire. Charles the Bald made it a county and conferred it on a Breton named Tertule, about the end of the ninth century. From him descended Geoffrey of Anjou, who married Matilda, daughter of Henry I., and widow of the Emperor Henry V., and became father of Henry II., the founder of the Plantagenet or Angevin dynasty in England. Anjou belonged to England until 1203, when Philip Augustus wrested it from John. In 1290 the land came to the crown of France by marriage, and was made a duchy. It was not finally attached to France until 1482, since which the dukedom has been held by several princes of the blood, *e.g.* by Francis [ALENÇON], by Henry III., and by Philip V. of Spain.

Anjou, CHARLES, COMTE D', fourth son of Louis VIII. of France, born about 1220. In 1264 Pope Urban IV. invited him to lead the Guelph faction, and to assume the crown of Naples and Sicily. He did so by defeating and killing Manfred and Conradin. The Spanish soon after destroyed Charles's fleet off Messina, and Pedro of Aragon claimed Sicily. Charles challenged his rival to single combat, but died at Foggia in 1285.

Anjou, FRANÇOIS DE FRANCE, DUKE OF. [ALENÇON.]

Ankarström, JOHANN JAKOB, a Swede of good family, born in 1761, who, after serving in the royal guard, conspired with Count Horn and others against the despotism of Gustavus III. On the night of March 15, 1792, he shot the king at a masked ball. He was pilloried, scourged, had his hand cut off, and was finally beheaded.

Anker, a liquid measure equal to about 10¼ imperial gallons, used in Holland.

Anklam, the capital of the province of the same name in Pomerania, North Germany, is situated on the Peene river, just as it flows into the Frische Haf, and is connected by railway with Stettin about 50 miles distant. It has a fair amount of trade, and manufactures woollen and linen goods.

Ankle Clonus. The condition of rapidly repeated flexion and extension of the foot at the ankle joint, which can be produced in certain forms of disease by a sudden flexion of the foot on the leg. It is not present in health, and its existence may be taken to indicate disease in the spinal cord.

Ankobar, former capital of the Shoa kingdom, in Abyssinia, North-east Africa. The town stands on a mountain over 8,000 ft. high, and just on the south-east borders of Abyssinia.

Ankylosis. [ANCHYLOSIS.]

Anna. There are three female characters connected with Biblical history who bore this name. 1. Anna, the wife of Tobit (Job i. 1). 2. Anna, daughter of Phanuel of the tribe of Asher, a prophetess, who recognised the Messiah when He was presented by the Virgin in the Temple (Luke ii. 36, 37). 3. The mother of the Virgin Mary, wife of Joachim of the tribe of Judah; but neither she nor her husband is mentioned in the Bible.

Anna Comnena, daughter of Alexis Comnenus I., Emperor of the East, was born in 1083. Having failed to place her husband Nicephorus on the throne, she spent her life in composing the *Alexiad*, a life of her father, which is still extant. She died in 1148.

Anna Ivanovna, Empress of Russia, the daughter of the Czar Ivan, the brother of Peter the Great, was born in 1693. After the death of her first husband, the Duke of Courland, she bestowed her affections and her hand on an adventurer Joan Biren. Ascending the throne in 1730 on the deposition of Peter II., she reigned with some ability, endeavouring to civilise her subjects. Biren, however, exercised a pernicious influence over her policy. The famous palace of ice on the Neva was a freak of this sovereign, who died in 1740.

Annals, the record of historical events arranged chronologically, and divided into periods containing one or more years. The Romans used to keep such records, which were known as *Annales Pontificum*, the Pontifex Maximus being the compiler; these were all destroyed at the sacking of Rome. Later, the term was used in a broader sense for any historical narrative chronologically arranged, and the term is thus applied to the *Annals* of Tacitus.

Annam. [ANAM.]

Annapolis, (1) the capital of the State of Maryland, U.S.A., situated on the north bank of the Severn, near Chesapeake Bay, 30 miles from Baltimore. It was originally founded in 1649, and was called Providence, but on receiving a charter from Queen Anne in 1708 adopted its present name. Besides handsome Government buildings there is the United States Naval College. (2) A town in the British colony of Nova Scotia. It was the first French settlement in that peninsula (1604), and then bore the name of Port Royal. During the occupation by the British in the seventeenth century it was the seat of Government, but it never prospered, and Halifax was subsequently chosen as the capital. It has a good harbour, which is rather difficult of access.

Annatto. [ANNOTTO.]

Anne, Queen of England, second daughter of James II. by his first wife, Ann Hyde, daughter of Clarendon, the historian, born in 1664. Both she and her elder sister Mary were brought up as Protestants. In 1683 she married Prince George of Denmark, a mere nonentity, but a well-meaning, inoffensive person. About the same period she came under the influence of Sarah Jennings and her husband, Lord Churchill, afterwards the famous Duke of Marlborough. By them she was induced to desert her father and to consent to the settlement of the crown upon William of Orange and her sister Mary, with a "contingent remainder" to herself. She now lived for several years in retirement, hating William and not being very fond of her sister. In 1700 she lost her only surviving child, the Duke of Gloucester (she had borne sixteen others, all of whom had died in infancy), and looking upon this as a judgment, wrote a most penitent letter to her exiled father. In 1702 she ascended the throne, and her reign has justly been regarded as one of the most glorious periods of English history, though personally she contributed but little to this grand result. Marlborough by his splendid victories on the Continent crushed the power of France, and, in spite of the Tories, brought the Wars of the Succession to a satisfactory termination; the Union with Scotland was effected on a firm and lasting basis; under the fostering patronage of statesmen a new literary era dawned, and the lines of that party government which has been fraught with many benefits to the country were distinctly laid down. Upon one public question alone does Anne appear to have felt strongly. She inherited enough of her father's nature to sympathise strongly with advanced High Church principles, and her zeal for the Establishment was so great that she alienated part of her income to establish "Queen Anne's Bounty" for increasing the value of small livings. With less wisdom she allowed Harley and Bolingbroke to drag her into the Sacheverell controversy and to use this absurd Jacobite reaction as a means for frustrating the great task that Marlborough had in hand. She was the last sovereign who "touched for the King's Evil" (q.v.), and Johnson has left it on record that he himself was so touched when a child. After the death of her husband in 1708 Anne shook off the personal influence of the Churchills, and yielded more and more to the advice of Mrs. Masham, once a dependent of the duchess, but now bedchamber woman to the Queen, and a tool of Harley. In 1710 the Tories, profiting by their intrigues, were put into office, overtures

for peace were made to France, and the treaty of Utrecht followed in 1713. Negotiations were secretly begun with a view to a Jacobite restoration, but in July, 1714, Anne's health broke down through an attack of dropsy complicated with apoplectic symptoms. She died on August 1, but the Duke of Shrewsbury adroitly stepped in, got from his dying mistress the appointment of Lord Treasurer, and was thus enabled to save the Protestant succession. The reign of Anne was remarkable for the number of illustrious literary men who flourished then, Addison, Steele, Pope, Johnson, and many others, all belonging to this period.

Anne of Austria, the daughter of Philip II. of Spain, married in 1615 to Louis XIII. of France. Cardinal Richelieu, the all-powerful Minister, became her bitter enemy owing, it was whispered, to unrequited affection, and the Duke of Buckingham, who openly showed his admiration for her, was more gently rebuffed. At the king's death she became Regent, with Cardinal Mazarin for her adviser. Their policy provoked the war of the Fronde, in which the queen and the cardinal triumphed over the nobility and wealthy classes. She died in 1666.

Anne of Brittany, the only daughter of Francis II., Duke of Brittany, born at Nantes in 1476, and at the age of five betrothed to the ill-starred heir of Edward IV. of England. After his death Louis of Orleans fell in love with her, but she was engaged to Maximilian of Austria. However, this marriage never took place, for Anne was compelled, in 1491, to give her hand to Charles VIII. of France, in order that her duchy might be added to his kingdom. He died, and her old lover succeeding as Louis XII., divorced his wife, and led Anne to the altar. She lived till 1514.

Anne of Cleves, the second daughter of John III., Duke of Cleves, born in 1516. Henry VIII. of England, fascinated by her portrait, painted by Holbein, made her an offer of marriage. On her arrival he was bitterly disappointed to find that she was pitted with small-pox, and was at no pains to conceal his disgust. However, the ceremony took place in 1540, and the queen's gentleness and forbearance won every heart except that of her husband. Henry divorced her in six months, and she spent the rest of her life in retirement, dying at Chelsea Palace in 1577.

Anne of Warwick, the first Princess of Wales and the last Plantagenet queen, a daughter of Nevill, Earl of Warwick, "the king-maker," born at Warwick Castle in 1454. However, Anne, in 1470, married at Angers, Edward of Lancaster. After his defeat at Tewkesbury, and his cruel murder, she remained for some time in hiding disguised as a servant. Both Clarence and Richard were suitors for her hand. The latter discovered her, and in 1473 forced her to marry him in spite of her undisguised aversion. On the birth of her son Edward her married life was happier, but when, in 1484, the young Prince came to an untimely end, her heart was broken. She died in 1485, perhaps of poison.

Annealing, the process of first heating to a high temperature, and then slowly cooling a metal or glass in order to temper it. Glass which has not undergone the process of annealing is exceedingly brittle, but when annealed is capable of resisting change of temperature and a certain amount of pressure.

Annecy, a lake and chief town in the department of Haute Savoie, France, 22 miles south of Geneva. The lake stands 1,426 feet above the sea level. The town, which until 1860 belonged to Piedmont, contains a cathedral, a college, an episcopal palace, and the old castle of the Counts of Geneva. St. Francis of Sales was bishop here. Printed calicoes, yarns, silks, and steel wares are the chief manufactures.

Annelida, a class of worms that included the CHÆTOPODA (the "bristle-footed" worms) and HIRUDINEA (Leeches). The association of these two groups into one class has been abandoned; the term Annelid is, however, often retained in an indefinite sense.

Annonay, a town in the department of Ardèche, France, situated at the confluence of the rivers Dianne and Cance, which flow into the Rhone, south of St. Etienne. The Gothic church is of the fourteenth century. There are paper factories, tanneries, woollen and cotton mills.

Annotto, ANATTO, or ARNOTTO. The red substance imported under this name consists of the aggregated seed pellicles of *Bixa Orellana*. The colouring matter is best extracted by alcohol, as it is not very soluble in water. Used in dyeing, and for colouring cheese and varnishes.

Annual, a botanical term applied to such plants as complete their life-cycle from the germination of the seed to the ripening of seed by the seedling plant and the death of that plant in a single season, as opposed to biennials and perennials. Annuals seldom form any woody tissue, are mostly small, and frequently complete their life within a few weeks, several generations being produced within the year. The name is also applied to publications which appear once a year, generally at Christmas time.

Annuity, a term signifying in its general sense any fixed sum of money which is payable yearly or in given portions at stated periods of the year. It may be determinable on the occurrence of a particular event, as the death of the grantor or grantee, or it may be perpetual or for a term of years. An annuity is usually created by the present payment of a certain sum as a consideration, and the rules and principles by which to estimate its value have been the subject of careful investigation. The present value of a perpetual annuity is a sum that will yield an interest equal to the annuity and payable at the same periods, and an annuity of this kind, payable quarterly, will be of greater value than one of like amount payable annually, because the annuitant has the advantage of interest on the quarterly payments.

The simple term annuity is commonly understood to mean a life annuity. The holder of an annuity of any kind is termed an "annuitant."

The value of a life annuity depends upon the manner in which it is presumed a large number of persons similarly situated with the proposed annuitant would die off successively. Various tables of these "decrements of life," as they are called, have been constructed from observations made among different classes of lives. Some make the mortality greater than others, and, of course, tables which give a large mortality give the value of the annuity smaller than those which suppose men to live longer. Those who buy annuities would therefore be glad to be rated according to tables of high mortality, or low expectation of life, while those who sell them would prefer receiving the price indicated by tables which give a lower rate of mortality.

In assurances the reverse is the case; the shorter the time which a man is supposed to live the more must he pay the office, that the latter may at his death have accumulated enough to pay his executors. Under the old Annuity Acts deeds granting annuities for lives by way of the repayment of money lent required to be enrolled in Chancery, but now, under the statute of 1854 and 1855, they require to be merely registered with the Registrar of Judgments at the central office of the Courts of Justice. Annuities or rent charges given by will are excepted from the operation of this Act. Annuities may also be regarded as legacies payable, not in mass at one time, but by instalments every year, or aliquot part of a year, therefore the word legacies in general comprises annuities.

The value of an annuity on the longest of two lives, that is, which is to be payable as long as either of the two shall be alive to receive it, is found by adding together the values of the annuity on the two lives separately considered, and subtracting the value of the annuity on the joint lives. For the above species of annuity puts the office and the parties in precisely the same situation as if an annuity were granted to each party separately, but on condition that one of the annuities should be returned to the office so long as both were alive, that is, during their joint lives. The value of an annuity which is not to be payable till either one or other of two persons is dead, and which is to continue during the life of the survivor, is found as in the last case, only subtracting twice the value of the joint annuity instead of that value itself. Consequently the value in this case is less than in the last, by the value of an annuity on the joint lives.

Sometimes an annuity is payable only out of income, and sometimes it is a charge on the corpus itself of the estate, in which latter case the annuitant may, if the income is insufficient, require a sale of a sufficient part of the corpus, and will even be entitled to a prospective order for the necessary successive future sales. An indefinite trust to receive rents for payment of an annuity is a charge of the annuity upon the corpus, and a direction to purchase an annuity for A entitles A to have the purchase money paid over to him or her, although the testator may have directed the contrary; and if the intended annuitant be dead his personal representatives will be entitled to the purchase money although the purchase money is to consist of the proceeds of land sold. [APPORTIONMENT.]

Annulet, in *Architecture*, a narrow flat moulding, which commonly encircles a column. In *Heraldry*, a ring on an escutcheon.

Annulosa, a term once used in classification, for a group including the worms, and the arthropods (the jointed limbed invertebrates).

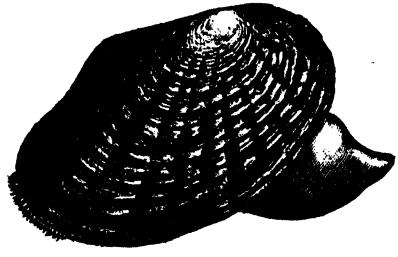
Annulus, one of the rings or segments of which the body of most worms is composed.

Annunciation, the announcing to the Virgin Mary that she was about to be the mother of Christ. The 25th of March (also known as Lady-day) is the day on which the churches celebrate the Annunciation. The Annunciation has formed the subject of some of the very finest paintings in Christian art, and indeed was so frequently chosen as a theme that an *annunciation* now frequently means a picture whose subject is the Annunciation.

Annus deliberandi (*a year for deliberating*), in the law of Scotland, the term of a year immediately following the period of the death of the proprietor of heritable property, allowed to the heir to make up his mind whether he will accept the succession with the burden of his predecessor's debts. The term of a year has lately been reduced to six months.

Anoa, a genus of bovine ruminants, with one species, *A. depressicornis*, a small straight-horned wild bull, peculiar to the Celebes, anatomically allied to the buffaloes, and somewhat resembling the bovine antelopes of Africa.

Anodonta Cygnea, the large fresh-water mussel, affords a good type of the structure of the bivalved mollusca. Its shell consists of two equal valves, which articulate on a hinge line, the ligament of which keeps them open when the animal



ANODONTA CYGNEA.

is dead. In a dissection the foot and gills are the parts that first attract attention by their size; the former is a triangular muscular organ, by which the animal crawls into the mud in which it is usually half buried. The gills are a pair of flaps composed of many lamellæ, or thin plates. The mouth is just above the foot, below the anterior of the two

strong muscles by which the shell is closed; from the mouth passes an œsophagus, which leads to a stomach, and this to the intestine; the anus is at the posterior or narrower end of the shell. The water that aerates the gills circulates through two tubes, which form a siphon; both openings of this are at the posterior end of the shell. The heart is a three-chambered organ just below the hinge line, and over a renal organ. The nervous system consists of three centres or ganglia united by nerve-cords. Pearls are sometimes formed in the shell from the innermost layer. Fisheries for them have been worked in England since the time of the Romans.

Anodyne, a remedy employed to dull the excitability of nerves, and to relieve pain. Among anodynes producing a local effect may be mentioned the application of cold, as by ice bags, or of warmth, as by poultices and fomentations. General anodynes include such drugs as opium, chloral, and hyoscyamus (q.v.).

Anointing, a very ancient custom of pouring oil upon a person's body. The Greeks and Romans used to anoint themselves after their baths, and the Jews attached a sacred significance to the custom. It is still in use in the Catholic Church, and also in the Coronation service of the English Church.

Anomalistic Year, a year of 365 days 6 hours 13 minutes 49·3 seconds, thus exceeding the sidereal year by 4 minutes 39·7 seconds. This is owing to the fact that the earth takes 4 minutes 39·7 seconds in travelling from perihelion (or point nearest the sun) to perihelion, because the longer axis of the earth's ellipse makes an annual advance of 11·8 seconds.

Anomaluridæ. [Flying Squirrels.]

Anomaly, an astronomical term connected with planetary motion, possessing three distinct applications: (1) the *true anomaly* of a planet at any instant is the angle its radius vector has swept out during the time since its last perihelion, or position of least distance from the sun; (2) the *mean anomaly* is the angle the radius vector would have traversed during this time, had the planet moved with its average speed instead of varying its rate of motion at different parts of the orbit; (3) the *excentric anomaly*, the angle subtended at the centre of the orbit, by the corresponding arc of the auxiliary circle. [Ellipse, Equation of Time, Year.]

Anomiidæ, or "thorny oysters," a family of molluscs ranging from the Devonian period (q.v.) to the present time.

Anomura, a division of the Decapoda (*Crustacea* with 10 pairs of limbs), including the Hermit Crabs, and other forms in which the abdomen is soft and unprotected; most of the members of the group are now included with the Macrura (q.v.). [Hermit Crab.]

Anoplura. [Lice.]

Anorexia, loss of appetite. *Anorexia nervosa* is the name given to a rare form of disease, affecting as a rule young girls, in which refusal of food, wasting and obstinate vomiting, are the main symptoms, and in which no structural disease is discoverable.

Anorthic (from the Greek *an*, not, *orthos*, straight), the name of one of the six systems of crystals, also sometimes called *triclinic*, as the crystals belonging to it have no two sides at right angles, but are inclined to the surface on which they may be placed in any one of three possible positions. They are not divisible by any plane of symmetry. The felspars crystallising in this system are, for a similar reason, termed *plagioclase*.

Anorthite, lime-felspar, the heaviest of the group, containing least silica (only 43 per cent.). It crystallises in the anorthic system and is found in Vesuvian lavas, but is not very frequent.

Anosmia, absence of the sense of smell.

Anquetil, Louis Pierre, a French historian, who was born in 1723, and became a priest. He was director of the Academy at Rheims, and of the college at Senlis, prior of the Abbey of St. Loe, and vicar of La Villette, near Paris. Imprisoned in the Reign of Terror, he regained his liberty, and found employment in the French Foreign Office. He wrote many historical works, and died in 1808.

Anquetil-Duperron, Abraham Hyacinthe, brother of the foregoing, was born in 1731. Wishing to study Oriental languages, he enlisted in 1754 as a private in a regiment destined for India. He received his discharge and remained in the East for eight years. On his return to France he refused Government employment, and in independent poverty set about publishing the results of his labours, the chief of which were a translation of the Zend Avesta, and a version in Latin of a Persian translation of the Vedas. His knowledge, however, of Oriental dialects was very imperfect, and his works have now but little value. He died in 1805.

Ansdell, Richard, R.A., animal and landscape painter, was born in 1815 at Liverpool. He made his *début* at the Royal Academy Exhibition in 1840. For several years he exhibited principally Spanish subjects. He received a gold medal at the Paris Exhibition of 1855, and in 1861 he was elected A.R.A., becoming a full Academician in 1870. He died in 1885.

Anselm, Saint, of Canterbury, was of Lombard family and born at Aosta 1033. From boyhood he had a desire to become a monk, and having left home became a pupil of Lanfranc at Bec in Normandy, assumed the cowl at the age of twenty-seven, and became first prior and then abbot of that foundation. His intellect was always engaged in theological speculations, but this did not interfere with his active duties, his ascetic habits, or his affectionate and kindly attention to those under his charge. In several visits to England he won the confidence of William I. and of the clergy, and some time after Lanfranc's death William II. appointed

him to the see of Canterbury. Then began a struggle between the royal and ecclesiastical authority which ended in Anselm's going to Rome and remaining abroad until William's death. Henry I. invited him to return and proposed to reinvest him, but both Pope and Archbishop denied the royal right of investiture, and after Anselm had visited Rome again in 1103 the king gave way. The prelate now returned and set about the reform of the Church and of the monastic establishments. At the Synod of Westminster, 1102, the celibacy of the clergy was insisted upon. His many writings put him at the head of the scholastic theologians. They include *Dialogus de Veritate*, *Monologium*, *Proslogion*, *De Fide Trinitatis*, and *Cur Deus Homo*, besides many devotional treatises. In philosophy he was one of the chief upholders of the "Realist" doctrine, that the "Essences" or "essential nature" of genera and species exist independently of the individual objects, and have existed from all eternity in the Divine Mind.

Anseres. [NATATORES.]

Ansgar, or ANSCHARIUS, "The Apostle of the North," was a Benedictine monk of the ninth century. Leaving his native country Picardy, he first settled in Westphalia, and subsequently travelled as a missionary over Denmark and Sweden, converting many. He was appointed Archbishop of Hamburg, and also of Bremen, and papal legate amongst the nations bordering on the Baltic. He died in 864, and was canonised.

Anson, GEORGE, Lord, Baron of Soberton, born in 1697 of a good Staffordshire family, entered the navy and was speedily promoted through the influence of his uncle, Lord Mansfield. In 1724 as post-captain he commanded a man-of-war off South Carolina, where he acquired land and gave his name to a county. In 1740 he was sent to counteract Spanish influence in the Pacific, but was not more than moderately successful, though he took the Manilla galleon. As vice-admiral in 1747 he defeated a French fleet off Cape Finisterre, capturing *L'Invincible* and *La Gloire*. For this he received a peerage. In 1751 he was made First Lord of the Admiralty, and held the office till close upon his death in 1762. His ability was undoubted, and was only equalled by his humanity, courtesy, and warmth of heart.

Anspach, or ANSBACH, the capital of the circle of Middle Franconia, Bavaria, South Germany, pleasantly situated on the Rezat 25 miles south-west of Nuremberg. It was formerly the chief town of the margravate of Anspach-Bayreuth, and the castle of the Margraves, a branch of the Hohenzollern family, still exists there. Besides several good churches and a gymnasium, Anspach possesses a picture gallery. The manufactures are silk and cotton fabrics, gold lace, furniture, earthenware, tobacco, white lead and cutlery.

Ansted, DAVID THOMAS, born in 1814, held for some years the secretaryship of the Geological Society, and the professorship of that science at King's College, the Military College, Addiscombe, and the Civil Engineering College. In later years he made a large income as consulting geologist. The distinction of F.R.S. was conferred on him, but except writing a few popular books on geological subjects, he did little for the advancement of science. He died in 1880.

Anstruther, Eastern and Western, two royal and parliamentary burghs in the county of Fife, Scotland, situated on the Firth of Forth, 13 miles from Cupar. Conjointly with other burghs they return one member to Parliament.

Antacids, drugs employed to counteract excessive acidity. The chief direct antacids are the carbonates and bicarbonates of sodium and potassium; they are used to lessen the acidity of the stomach. Remote antacids, such as the tartrates and citrates of sodium and potassium, are employed to diminish the acidity of the urine.

Antæus, the legendary son of Neptune and Terra,—Sea and Land. According to classical mythology he was a giant who made his home in Libya and massacred all who came within his reach. Hercules undertook to exterminate the monster, but each time that he struck him to earth new vigour was imparted by his mother. The hero, therefore, lifted his foe in air and strangled him.

Antalcidas, a Spartan general, who, in command of the fleet, forced the Athenians to submit to his own terms. He then negotiated with Artaxerxes of Persia, and in 387 B.C. concluded a treaty by which the Greek cities in Asia were surrendered to the king in return for his help in subjugating Greece. This act brought upon him such odium that he fled to Persia, but, being repudiated by Artaxerxes, returned to Greece and died, according to Plutarch, of voluntary starvation.

Antananarivo, the capital of Madagascar, situated on a hill 5,000 ft. above the sea level. Despite its exposed position it makes much progress towards civilisation.

Antara, or ANTAR, an Arabian warrior and poet of the sixth century A.D. His marvellous adventures in pursuit of the hand of his cousin Abla, and his death by assassination, form the subject of a romance, which is a kind of Arabian Iliad.

Antarctic Sea, or SOUTHERN OCEAN, corresponds to the Arctic Ocean which surrounds the North Pole, but its limits are less accurately defined as it verges imperceptibly into the Pacific, Atlantic, and Indian Oceans. It is boisterous, foggy, difficult of approach, and beset with ice which extends 10° nearer to the equator than that of the northern seas. Magellan was the first to traverse it in 1520. The Dutchman De Gheritk saw land in 1600, probably New South Shetland. Wallis and Carteret in 1766, and Cook in 1773-4 made further explorations. Kerguelen in 1772 discovered the island that bears his name. In 1831 Captain John Biscoe, commanding an expedition fitted out by Messrs. Enderby, discovered land in lat. 65° 57′ S., long. 47° 20′ E., extending E. and W. for 200 miles, and he named it Enderby Land. In the

following year he found Graham's Land, lat. 67° 1′ S., long. 71° 48′ W. Further expeditions led to the discovery of Balleny Islands and Sabrina Land in nearly the same latitude. In 1840 Admiral d'Urville on behalf of the French, and Commodore Wilkes on behalf of the Americans, made valuable explorations, and in 1841 Sir J. C. Ross in the *Erebus* and *Terror* reached Victoria Land, found two active volcanoes which he named after his vessels, and got as far south as lat. 78° 11′. Early in the 20th century attempts were made to reach the South Pole, the most successful of which was that of Lieutenant Shackleton, who on January 10, 1909, succeeded in planting Queen Alexandra's flag on a point only 111 miles from the South Pole.

Anteaters (*Myrmecophagidæ*), a family of Edentate mammals, confined to the wooded parts of the Neotropical region. They are clothed with hair; quite toothless; mouth tubular, with a small aperture, through which the long vermiform tongue, covered with a viscid secretion, is protruded in

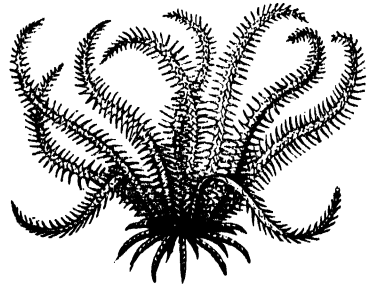
THE GREAT ANTEATER (*Myrmecophaga jubata*).

feeding; the third digit of the fore limbs is greatly developed, and armed with a strong claw. There are three genera: (1) Myrmecophaga, with a single species (*M. jubata*), the great anteater, or ant-bear, widely distributed in the swamps of Central and South America. In length it is about four feet, exclusive of the tail, which is about as much more, and fringed with long hair; general colour, dark grey, with a broad black band edged with white passing from the chest backwards across the shoulders to the loins. When the animal stands still it is higher at the shoulders than behind, and it rests on the sides of the fore feet, where there is a callous pad, the claws being bent inwards and upwards. This species is wholly terrestrial, and feeds almost entirely on ants, to procure which it breaks open their dwellings with the powerful claws of the fore feet, and draws them rapidly into its mouth with its flexible tongue. (2) Tamandua, from Guatemala, ranging through South America from Ecuador to Paraguay. There is one well-defined species (*T. tetradactyla*), but as individuals vary greatly in coloration, Professor Flower thinks it possible there may be more. This form is arboreal, about half the size of the great anteater, the head is shorter, the tail prehensile, and covered with scales on the under side and terminal part. The general colour is yellowish-white, with a broad band on the side. (3) Cyclothurus, with one species (*C. didactylus*), the little, or two-toed, anteater, also arboreal. It is about the size of a squirrel, yellowish in colour, but little is known of its habits. The name anteater is given in Australia to a small marsupial *Myrmecobius fasciatus*, about the size of a squirrel; the fur is chestnut-red, marked on the hinder part of the back with broad white transverse bands. [AARDVARK, ECHIDNA, PANGOLIN.]

Antecedent, in *Grammar*, the word preceding a relative pronoun, to which the relative points back. In *Logic*, the proposition or statement upon which another depends. In *Mathematics* (pl.), the first and third terms in a series of four proportionals.

Antediluvian (lit. *before the deluge*), the term used of anything that happened or existed before the Flood; also of anything very antiquated and old-fashioned.

Antedon. Though not a good representative of the CRINOIDEA (q.v.), *A. bifida* is usually selected for study, as the only easily procurable species of the class. In its larval or "Pentacrinus" stage it is fixed by a short jointed stem, as in the typical

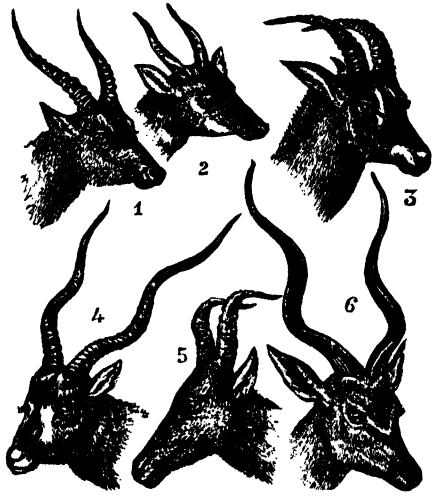


ANTEDON (*Antedon bifida*).

Crinoids, but it soon becomes detached from this, and is free-swimming for the rest of its existence. The adult antedon consists of a disc, giving off ten arms fringed with pinnules (small branches of the arms), and bearing below a number of short processes known as cirri. The mouth and anus both open in the upper surface of the disc; the former is central; the alimentary canal consists of a single coil. The nervous, water-vascular and blood-vascular systems (for descriptions see CRINOIDEA) each consist mainly of a ring round the mouth from which a branch runs up each arm; from the blood-vascular ring a vessel runs down to a "chambered organ" placed at the bottom of the cavity of the disc; round this is a second nervous centre giving off cords through the arms. The communication of the water-vascular system with the exterior is effected through a large number of pores, scattered over the body, instead of being collected into one plate as in the sea urchins. The skeleton is composed

of a central plate bearing the cirri, which is surrounded by two rings of five plates (basals and radials), of which the outer bears ten arms; the arms are composed of many small joints. *Antedon bifida* is fairly common in many places round the English coast. Its popular name is the "Rosy Feather Star," and it is often known as *A. rosacea.*

Antelope, a term of wide signification, denoting any species of the Linnæan genus Antilope, now broken up into several distinct genera, and sometimes grouped into a family (*Antilopidæ*), but more generally placed with the sheep, goats, and oxen in the family *Bovidæ*, equivalent to the *Cavicornia*, or hollow-horned division of the Ruminants (q.v.), in which the horns are permanent, and consist of thin sheaths surrounding bony processes of the skull (known as horn-cores), almost solid in the antelopes, while in the other members of the group they are occupied with cells. Horns are often present in antelopes of both sexes, and are generally round, or annulated, never exhibiting the prominent angles and ridges which distinguish those of the sheep and goats, but in their particular forms and curvatures they differ greatly in different genera. Antelopes are characterised by their graceful, deer-like forms, their long and slender legs, generally with supplementary hoofs behind the true hoofs; tail usually short, hair short and smooth, and ordinarily of equal length all over the body, though in some cases there is a long bristly mane on the neck and shoulders, and in others the hair is long and shaggy, as in the waterbuck, while forms from cold mountainous regions bear wool mixed with long coarse hair. [ROCKY MOUNTAIN SHEEP.] Tear-pits, or lachrymal sinuses, are generally present, as in the deer (q.v.), thus differentiating the antelopes from oxen, sheep, and goats, in which these organs are never found, and with which the antelopes are most likely to be confounded. [ARGALI.] Another characteristic is the possession of inguinal pores—deep folds of the skin opening inwards in the groin, and secreting a glutinous substance resembling ear-wax; a beard or dewlap is rarely present. These animals differ greatly in size, an eland bull standing six feet at the shoulder, while the guevei is only some eight or nine inches; but nearly all peaceable, even timid animals, remarkable for fleetness and agility. Generally speaking they are gregarious; some species, however, reside in pairs or small families consisting of an old male, and one or more females, with the young of the two preceding years. They place sentinels to warn them of the approach of danger while feeding or reposing, and their sight and smell are so acute that only by the exercise of the greatest caution can the hunter approach within gunshot. The habitat of the different genera and species differs widely in character. Some frequent dry, sandy deserts, feeding on the stunted acacias and bulbous plants of such regions; some prefer open stony plains, where the grass, though parched, is still sufficient for their subsistence; some inhabit lofty mountain ranges and leap from crag to crag like wild goats, while others are found in the deep recesses of tropical forests. Africa, particularly the southern region, is their peculiar home. In that continent are found the Eland, the Koodoo, the Addax, the Oryx, the Gnu, the Bubaline antelopes, the Hartebeest, the Springbok, the Steinbok, the



ANTELOPES.
1, Water Buck; 2, Harnessed Antelope; 3, Hippotragus 4, Addax; 5, Hartebeest; 6, Koodoo.

Gazelle, the Nakong, and many others which will be found described under their popular names. Asia has some fifteen species, including the Nylghau, the Sasin, often called "the Antelope," the Dzeren, the Chikara, etc.; Europe has two species, the Chamois and the Saiga (which extends into Asia); and America two, the Prong-horn and the Rocky Mountain Sheep.

Antennæ, the organs of touch and hearing of insects, myriapods, and crustaceans, placed in nearly the same position as the horns of ruminants. They vary considerably in their form, and the number of joints they possess.

Antequera (anc. *Antecaria*), a city in Andalusia, Spain, about 28 miles inland from Malaga. It was taken from the Moors 1410, by Ferdinand of Castile, but the old Moorish castle still exists. There are marble quarries in the vicinity, and manufactories of silk and woollen tissues, paper, morocco leather, etc.

Anthela, a variety of the inflorescence known as a cyme (q.v.), in which numerous lateral flowering branches spring from each axis that ends in a flower, and overtop the axis that bears them, as in many rushes and in the meadowsweet.

Anthelion, a luminous ring seen by a spectator as encircling the shadow of his head thrown upon a cloud or fog opposite to the sun. It is seen in alpine or polar regions, and is due to the diffraction of light (q.v.).

Anthelmintics, remedies employed to destroy and expel from the body certain parasites which at times infest the intestines. Tape-worms, round-worms, and thread-worms are the varieties of such parasites most commonly met with. The chief drug used to expel tape-worms is the liquid extract of male fern. Turpentine and pomegranate root are also sometimes employed. Santonin has acquired a reputation for the expulsion of round-worms, while thread-worms are best destroyed by the use of local injections of infusion of quassia or alum. The use of any of these remedies should not, however, be lightly undertaken, and on no account except under professional advice.

Anthem (a form of ANTIPHON), in *Music*, a musical composition set to the words of a psalm or other sacred words, and sung as a part of the service in a church. In the Church of England the *anthem* follows after the third collect. The introduction of the anthem as part of the church service dates from the reign of Elizabeth. The number of English composers who have excelled in anthem-writing is very large, including Tallis, Byrd, Purcell, Boyce, Attwood, Greene, Gibbons, Goss, etc.

Anther, that portion of the stamen of a flowering plant that contains the pollen. It may be compared to the blade of a leaf and to the microsporangium in lower plants. The typical anther is oblong, divided perpendicularly into two *lobes*, with a midrib or *connective*. The lobes commonly split longitudinally, and discharge the pollen from the *loculus*, or chamber within. This cavity results from the fusion of two primitive *pollen-sacs*. Anthers are usually yellow.

Antheridium, an organ of various form and position in different groups of cryptogamic plants, analogous to the anther in flowering plants. In most cases it bursts and discharges minute protoplasmic bodies, furnished with cilia, which are known as *antherozoids*. These swim about in water and ultimately fertilise the germ-cell. They thus represent the contents of the pollen-tube in flowering plants.

Anthology (Greek, *collection of flowers*), a collection of selected passages of prose or poetry—usually of separate short poems. The *Greek Anthology* is an ancient collection of the latter type, containing most of the poems of the Greek epigrammatists, of whom Meleager and Agathias are the best known.

Anthomedusæ, one of the two groups of CRASPEDOTE MEDUSÆ (q.v.), including the small bell-shaped jelly-fish, provided with eye spots; they are stages in the life history of Gymnoblastic Hydrozoa (q.v.), *i.e.* they bear the eggs which grow into the plant-like colonies which produce a second generation of the free jelly-fish. [JELLY-FISH.]

Anthon, CHARLES, LL.D., the well-known American scholar, was born in 1797. He began active life as a barrister, but his taste for scholarship led to his eventual appointment as Classical Professor at Columbia College, New York. His popular editions of the Classics served for many years to lighten the labours of schoolboys, and are still in use. He died in 1867.

Anthoxanthum, named from their yellow anthers, a small genus of meadow grasses, natives of Northern Europe and Asia. Their flowers have only two stamens, but they are chiefly noticeable for their fragrance, to which much of that of new-mown hay is due. This is produced by the presence of a substance known as *coumarin*.

ANTHOXANTHUM, WITH FLOWER.

Anthozoa, a sub-class of the Cœlenterata, including those in which the digestive chamber is partially separated from the general body cavity, and in which the reproductive elements are shed into the body cavity, and thence pass out through the mouth. The group is divided into two orders—the ALCYONARIA and the ZOANTHARIA. [ACTINIA.]

Anthracene, or ANTHRACIN ($C_{14}H_{10}$), occurs in coal tar. It is a white crystalline substance with a blue fluorescence; is insoluble in water, and but slightly soluble in alcohol, ether, and benzine. M.P. 213° C.; B.P. 360° C.

Anthracite, an extremely non-bituminous coal, containing 90 to 95 per cent. of carbon. It has a sub-metallic lustre, is sometimes iridescent, has a conchoidal fracture, is harder and heavier than ordinary coal, and does not soil the fingers. It ignites with difficulty, but burns with an intense heat and without smoke. It occurs where coal-seams have been contorted, as in South Wales and Kilkenny

Anthracomarti, an order of ARACHNIDA, found only in the Palæozoic rocks. The type genus *Anthracomartus* occurs in the coal measures of Europe and America.

Anthracoscorpii, a subdivision of the Scorpions, limited to the Palæozoic. *Palæophonus* from the Silurian rocks of Scotland and Sweden, and *Eoscorpius* from the coal measures, are the best known genera. The members of this group differ from the remainder of the Scorpions (NEOSCORPII) in that the eye tubercles on the upper surface are on or close to the anterior margin of the body.

Anthracosia, a genus of bivalved mollusca common in the coal measures and Permian rocks; it probably indicates that the rocks and coal seams in which it occurs were formed under brackish water.

Anthrax, a word sometimes used as synonymous with carbuncle, its etymological signification, a live coal, rendering it an apt description of the pain and other phenomena attendant upon certain local inflammations. Recent observations have, however, conclusively shown that the splenic fever of cattle, and what is known as woolsorter's disease in man, are closely-related diseases; both being, in fact, due to the invasion of the body by a

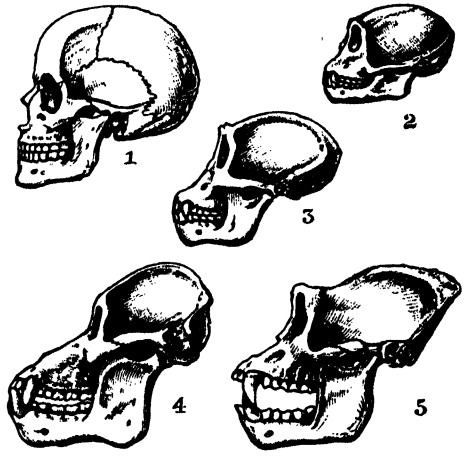
living organism of microscopic size, which possesses the power of excessively rapid multiplication under suitable conditions; and anthrax is now by universal consent the name given to the disease produced by this organism. In man the disease is commonly acquired by inoculation of a scratch or other abraded surface from the skins of animals which have died of anthrax; inflammation is set up at the seat of injury, and what used to be called a malignant pustule is produced. Sometimes, however, there is no skin lesion discoverable, and to this class of cases the term internal anthrax is applied.

Splenic fever in cattle is a disease of much more frequent occurrence than human anthrax. It is so called from the great enlargement of the spleen which is observed in animals dying from the disease. Horses, cattle, and sheep are all affected, and such is the loss occasioned by an epidemic, that a system of protective inoculation, devised by Pasteur, has been largely adopted in France.

Great interest attaches to the micro-organism which is the cause of the disease, the *bacillus anthracis* as it is called. It afforded the first example of an epidemic disease being proved to be caused by a bacterial parasite. The anthrax bacilli are very minute, 200,000 of them arranged end to end would only form a line of about three feet in length; each bacillus is about five times as long as it is broad. The blood of animals dying of anthrax teems with these minute rods, a single drop may contain millions of them, each rod being capable of vegetating in a suitable soil. The bacilli themselves are readily destroyed by certain agents, but unfortunately they possess the power of forming spores, minute egg-shaped bodies, which offer much greater resistance to mechanical injury, drying, heat, and chemical agents. These spores may retain their vitality for months and form a ready means of setting up further infection.

The treatment of human anthrax consists in early removal of the infected tissue, while in some cases the injection of carbolic acid has been attended with success.

Anthropoid Apes, a collective name for the gorilla, the chimpanzee, the orang, and the gibbon (see these words), from their outward resemblance to the human form, their semi-erect mode of progression, and their close anatomical relationship to man. [APE.] Of these four the gorilla most nearly approaches man in the structure of the feet and hands [QUADRUMANA]; the chimpanzee in the form of the skull, the orang has the most highly-developed brain, and the gibbon the most man-like chest. With regard to the connection between man and this group, Huxley has stated that the lowest apes are farther removed from the higher forms than these are from man. The external resemblance is especially striking when young human and anthropoid forms are compared; and it is an important fact that in every respect the young anthropoid stands nearer to the human child than the adult anthropoid does to the adult man. The evolutionary view as to the common origin of anthropoids and man cannot be better stated than by Tylor:—"No competent anatomist who has examined the bodily structure of these apes considers it possible that man can be descended from any of them, but according to the doctrine of descent they appear as the nearest existing offshoots



HUMAN AND ANTHROPOID SKULLS.
1, Man; 2, Gibbon, 3, Chimpanzee; 4, Orang; 5, Gorilla.

from the same primitive stock whence man also came." But it must be borne in mind that palæontology throws no light on the question of "primitive stock" or "common ancestor," for the oldest known fossil anthropoid seems to be closely related to existing species. [DRYOPITHECUS.]

Anthropology, according to its strict meaning, is the science of man in the widest sense; but the term is usually taken as the equivalent of the German *Culturgeschichte* or *Culturwissenschaft, i.e.* the history or science of civilisation, and in that sense it is dealt with here. Leaving the antiquity of man to geology, his physical nature, structure, and functions to zoology, anatomy, and physiology, and the question of races to ethnology, anthropology is concerned with man as a social being, and endeavours to trace his development from savagery to the culture of the present day. With regard to the origin of man, it is sufficient to state that the view of most anthropologists is that of Darwin, while the orthodox view of creation is stoutly maintained by Quatrefages and others. The first subject matter of anthropology dates from quaternary times, when indubitable traces appear of man as a hunter and fisherman, associated with the tools he used and the bones of the animals on which he fed. By this time he had learnt how to produce fire from flint-sparks or by the fire-drill, and had made some progress in the arts, as his drawings and carvings testify. Starting from this solid foundation, anthropology endeavours to bridge the gulf which separates quaternary man from his fellows of the nineteenth century, not merely by

tracing, but by endeavouring to account for, development in every branch of culture. It will thus be seen that anthropology covers a wide field; and its importance cannot be better expressed than in the following words of Dr. Tylor:—"The study of man and of civilisation is not only a matter of scientific interest, but at once passes into the practical business of life. We have in it the means of understanding our own lives and our place in the world, vaguely and imperfectly, it is true, but at any rate more clearly than any former generation."

Anthropometry, the scientific measurement of the human body and its parts, including observations on the colour of the hair, eyes and complexion, etc. The relative brain-power of different races has long been approximately gauged by filling the brain-case with shot or seed and measuring the contents. Anthropologists, especially on the Continent, have now adopted a series of measurements as a basis of race-classification. This system has also been successfully used in France as a means of identification of criminals. The work of Galton in connection with the subject is well known.

Anthropomorphism, the attributing of human form to God. This is frequently done in Scripture, where we read of "the eye" or "the arm" of the Lord. Nearly all nations have a similar idea, but by some Christian and other philosophers the practice has been severely condemned. The earliest case in history of this censure is in the fragments of the Greek philosopher Xenophanes (circa 530 B.C.).

Anthropophagy. [CANNIBALISM.]

Antiaris. [UPAS TREE.]

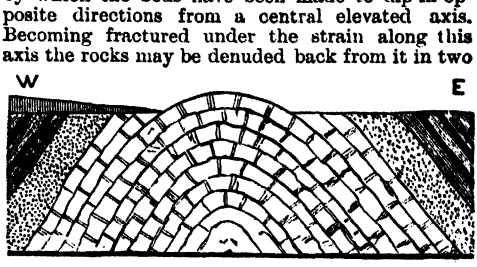
Antibes (anc. *Antipolis*), a town and port in the department of Alpes-Maritimes, France. It was founded about 340 B.C. on a peninsula opposite Nice, whence its name. The Arabs destroyed the place, but under Francis I. and Henry IV. it was strongly fortified. It successfully resisted the Imperial forces in 1746, and is still maintained as a place of arms. The *Antibes' Legion*, which served the Pope during the French occupation of Rome, was recruited here.

Antichlor, any substance used for removing the last traces of chlorine from a material which has been bleached by chloride of lime. Hyposulphite of soda (*Sodium thiosulphate*) is now most commonly employed. Sulphide of calcium and stannous chloride have, among other substances, been used as antichlors.

Antichrist, the name given by St. John to a personal opponent of Christ, and who has been identified with the enemies of Christianity referred to by early prophets. The idea contained in St. John's title is that of "one who set himself up *instead of* Christ." Various individuals at various times have been named as the Antichrist referred to, notably Nero, Mahomet, and Napoleon I.

Anti-climax. [BATHOS.]

Anticlinal, ANTICLINE, or SADDLE-BACK, a geological term, applying to an upward fold in rocks by which the beds have been made to dip in opposite directions from a central elevated axis. Becoming fractured under the strain along this axis the rocks may be denuded back from it in two



ANTICLINAL ROCKS.

parallel lines of escarpment forming an *anticlinal valley* or *valley of elevation*, such as that of the Weald of Surrey, Sussex, and Kent.

Anti-Corn Law League, an association formed in 1838 for the purpose of procuring the abolition of the Corn Laws, which imposed a tax upon corn. It attained its object in 1846, and accordingly ceased to exist.

Anticosti, or ASSUMPTION ISLAND, lies in the Atlantic Ocean opposite the mouth of the St. Lawrence, and belongs to England. It was discovered in 1531 by Jacques Cartier, and is 135 miles long by 40 broad in its widest part, with an area of 3,500 square miles. The interior is mountainous, but well wooded. The officials of lighthouses are the only regular inhabitants, although it has been visited for game shooting in recent years.

Anticyra, an ancient town of Phocis, on the Corinthian Gulf. It was celebrated for its hellebore, which was supposed to cure insanity, hence the proverb *Naviget Anticyram* ("Let him sail to Anticyra"), which was said of anyone acting foolishly.

Antidotes, remedies employed to counteract the ill effects of poisons. It is a matter of the first importance in most cases to get rid of as much as possible of the poison by means of emetics or the stomach pump, which means, of course, the speedy procuring of skilled assistance. Still, certain substances do possess a distinct value as antidotes against particular poisons. Thus, where an acid has been swallowed, carbonate of soda, chalk, or magnesia are of value; in the case of poisoning by alkalies, vinegar, lemon-juice, or other dilute acids are indicated. Oxalic acid, salts of lemon, or salts of sorrel, should be treated with chalk or whiting. Tartar-emetic with tannic or gallic acid. The antidote for arsenic is freshly precipitated oxide of iron; for carbolic acid, saccharated solution of lime. Lastly, if a poisonous metallic salt has been swallowed, white of egg may be freely administered.

Antigone, the daughter, in Greek legend, of Œdipus, King of Thebes, to whom she served as a guide and protectress when he was blind and exiled. Disobeying the commands of Creon, she gave the rites of burial to the corpse of her brother Polynices, and was condemned to a living tomb, her lover Hæmon, Creon's son, killing himself on the

spot where she died. Antigone was the subject of dramas by Sophocles and Euripides, and has been handed down from age to age as a pattern of maidenly courage and sisterly love.

Antigonus, (1) surnamed "The Cyclops," from having but one eye, a Macedonian general under Alexander. At the death of his master he took Pamphylia, Lycia, and Phrygia Major as his share of the empire. In conjunction with his son Demetrius Poliorcetes he entered the league against Perdiccas, attacked Eumenes and Ptolemy, conquered all Asia Minor and Syria, and called himself King of Asia. He died in 301 B.C., at the age of eighty-four, from a wound received at Ipsus, where he was defeated by the united forces of Seleucus, Lysimachus, Cassander, and Ptolemy. (2) GONATAS (from Gonni, his birthplace), son of Demetrius Poliorcetes and grandson of preceding, who came to the throne of Macedon in 278 B.C. He refused to join Pyrrhus against Carthage, and was driven from his dominions by that prince. Eventually he was restored, and defeated his conqueror near Argos. He died in 242 B.C., in the seventy-seventh year of his age. (3) King of the Jews, son of Cristobulus II. and last of the Asmonean dynasty. When Pompey took Jerusalem he carried this prince to Rome. The Romans refused to give him his father's crown, so he called in the aid of the Parthians, and in 40 B.C. began to reign. Mark Antony was then sent to re-establish Herod, and Jerusalem yielded 37 B.C. Antigonus was executed at Antioch.

Antigua, one of the British Leeward Islands in the West Indies (lat. 17° 7′ N., long. 61° 50′ W.). It was discovered by Columbus in 1493, and was colonised by the English under Lord Willoughby in 1632. The French ravaged it in 1666, and like most of the West Indian islands it has occasionally changed hands. St. John, its capital, is the seat of government for the Leeward Islands and also of the bishopric. Falmouth and Parham are other towns of importance. The country is mountainous, and rather deficient in water. There is a good harbour, affording a station for the Royal Mail Packets. Produce: sugar, rice, arrowroot, tobacco, and rum.

Antilegomena, those books of the New Testament not at first admitted into the canon. [BIBLE.]

Antilles, an archipelago in the Atlantic, composed of islands that extend in a curve from the Gulf of Florida to the Gulf of Maracaibo, embracing in their midst the Caribbean Sea. The term, however, does not apply to the Bahamas. The Greater Antilles include Cuba, Jamaica, Hayti, and Porto Rico, and the islands west and south-west of these are called the Lesser Antilles. These latter are divided, according to the prevailing trade wind, into the Leeward Islands to the north, and the Windward Islands or Caribbees to the south. But this classification is somewhat vague, the Greater Antilles and the islands off the coast of Venezuela being sometimes grouped with the Leeward Islands, whilst the Virgin Islands, west of Porto Rico, are looked on as distinct. The total area of the Antilles is about 90,000 square miles. Cuba in 1902 became a Republic. Porto Rico since 1898 has belonged to the United States. The remainder are divided as follow between various European Powers. GREAT BRITAIN: Jamaica, Tortola, Anegada, Antigua, St. Christopher, Montserrat, Nevis, Barbuda, Anguilla, Dominica, St. Lucia, St. Vincent, Grenada, the Grenadines, Barbados, Tobago, and Trinidad. FRANCE: Guadeloupe, Martinique, Marie Galante, Désirade, Petite Terre, Les Saintes, and part of St. Martin. DENMARK: Santa Cruz, St. Thomas, St. John. DUTCH: Curaçoa, St. Eustace, and part of St. Martin. SWEDEN: St. Bartholomew. As a general rule the islands are fertile, producing sugar, cocoa, coffee, drugs, fruits, timber, etc., and possess a warm climate tempered by winds which at certain seasons take the form of destructive hurricanes, or cyclones. These islands are fairly healthy considering their tropical position, but are liable to occasional visitations of yellow fever. Each of the principal members of the groups will be found described under its own name. Columbus, after discovering the Bahamas, came upon Cuba, which he took to be Antilla, an imaginary island placed by the early geographers west of the Azores. Hence the name Antilles.

Antimonite, STIBNITE, or GREY ANTIMONY ORE, the sulphide of antimony (Sb_2S_3), is the chief ore of antimony. It occurs generally in veins, has a lead-grey colour, metallic and sometimes iridescent lustre, often a fibrous or columnar structure, and is soft and extremely fusible. It is worked at Felsobanya and elsewhere in Hungary, in Borneo, Nevada, and New Brunswick. Very large crystals are obtained from Japan. It has long been used by women in the East to darken the eyelids.

Antimony (Sb = 120), a metal first discovered in the fifteenth century. It usually occurs in nature as sulphide or trioxide. Commercial antimony is invariably prepared from the sulphide, and may be very conveniently extracted by fusing this ore with metallic iron. The removal of arsenic, which is apt to be associated with antimony, is of great importance where the latter is required for preparing medicines. Antimony is a bluish-white, brittle, and very crystalline metal; S.G. 6·7; M.P. 425° C. It is not acted on by air at ordinary temperatures, but rapidly oxidises when melted, forming the trioxide (Sb_2O_3). Antimony is used in the preparation of alloys (Ex. type metal) and also in medicine—chiefly in the form of "tartar-emetic" ($C_4H_4K.SbO_6$).

Antinomians, those who hold that a Christian is not bound to observe the moral law, as Christianity is opposed to law. The doctrine was strongly upheld by John Agricola (q.v.) in the 16th century.

Antinous, (1) a character in the *Odyssey* of Homer, who paid court to Penelope. (2) A handsome Bithynian youth, the favourite of the Emperor Hadrian, who built Antinoopolis to his memory near the spot where he was drowned in the Nile, 122 A.D. Many statues and medals handed down his features to posterity, so that he became regarded as a type of youthful beauty.

Antioch (classic *Antiochia ad Daphnen*, from its proximity to the grove and temple of Apollo; Turk., *Antakieh*), a city on the river Orontes, in

Syria (in Turkey), 57 miles from Aleppo. Founded by Antigonus I. 300 B.C., it was completed by Seleucus, and named after his father, Antiochus. It

THE WALLS OF ANTIOCH.

prospered exceedingly, and when taken by the Romans (64 B.C.) it had 700,000 inhabitants, and was called the "Queen of the East," being the capital of Syria. The name "Christian" first came into use here, and it was the birthplace of St. Luke and St. John Chrysostom. During the first eight centuries of the Church numerous councils were held at Antioch, and it became a patriarchate with widely extended authority in the East. Earthquakes devastated the city during the first five centuries A.D., but Justinian repaired it in 529 and called it Theopolis. After this the Persians twice captured and sacked it, and an earthquake in 588 destroyed 60,000 people. It fell into the hands of the Saracens in 638, and was held by them till Godfrey of Boulogne retook it after a bloody siege in 1098. The Sultan of Egypt annexed it finally to Turkey in 1268, and except during the brief occupation by Ibrahim Pasha in 1832, it has belonged to the Porte ever since. The shocks of earthquake were repeated in 1822 and 1872. Traces of the ancient walls exist, and modern Antioch occupies a mere corner in the vast enclosure. There are ruins of a great aqueduct, and of a fortress built by the Crusaders. Silk is the chief product, but earthenware, leather goods, and goat's wool tissues are made. Many other Antiochs were more or less famous in antiquity, *e.g.* Antioch in Pisidia or Cæsarea (Acts xiii. 14), Antiochia ad Cragum, Antiochia ad Taurum (Mod. *Ain-Tab*), Antiochia Mygdoniæ (Mod. *Nisibia*), and Antiochia Margiana.

Antiochus, the name of many kings of Syria of the Seleucian dynasty, the chief of them being:—

ANTIOCHUS I., Sotêr (Saviour), so called because he saved his country from an irruption of the Gauls about 270 B.C.

ANTIOCHUS III., the Great, who succeeded in 225 B.C., and carried his victorious arms as far as India. The free cities of Greece being threatened by him applied to Rome for aid, and the two Scipios took the field against him, while Hannibal sought refuge at his court. Being defeated at Thermopylæ (191) and Magnesia (190) he accepted a humiliating peace, and in 186 was killed whilst attempting to pillage a temple at Elymais.

ANTIOCHUS IV., Epiphanes (*Illustrious*), conquered Egypt (2 Macc. iv. 5), and on his way home determined to crush the rebellious Jews (171 B.C.). Entering Jerusalem, he is said to have killed 80,000 and sold or carried off an equal number of inhabitants. He also robbed the temple. Three years later he sent Apollonius (2 Macc. v. 24, 25) with orders to sweep away the whole population, or convert it to Greek Paganism. Judas Maccabeus successfully resisted this attempt, and recaptured the Temple. Antiochus died in 164 B.C.

ANTIOCHUS XIII., known in Roman history as *Asiaticus*, the last of the line. He was installed by Lucullus on the throne from which his father had been driven by Tigranes, but in 64 B.C. Pompey stripped him of his dominions, and made Syria a Roman province.

Antipædo-baptists. [BAPTISTS.]

Antiparos (classic *Oliaros*), an island in the Greek Archipelago, between Paros and Siphanto. It is about 10 miles in circumference, and has but few inhabitants. There exists here a remarkable stalactite grotto, 300 feet square and 80 feet high.

Antipater, a Macedonian general and administrator, who served faithfully under Philip, and was left by Alexander in charge of home affairs during his absence in Asia, and resumed power after the death of the king. The Greeks, roused by Demosthenes to assert their independence, attacked and besieged him in Lamia, but he conquered them at Cranon, and subverted their democratic constitutions (B.C. 322). He died in 320.

Antipater, or ANTIPAS, an Idumæan, who won the good offices of Julius Cæsar, and obtained from him the government of Jerusalem for his eldest son Phasael, and that of Galilee for his younger son, afterwards known as Herod the Great. He was poisoned by Malichus in 43 B.C. [For his grandson *see* HEROD ANTIPAS.]

Antipatharia, the "black corals," is an order of the ZOANTHARIA (q.v.). They are colonial animals, and form great plant-like growths; these consist of a central horny axis, attached by its base during life to the rocks or sea bottom on which it lives. This axis is covered by a fleshy layer (known as the cœnosarc), and in this the polypes (the separate individuals of the colony) are embedded.

Antipathy, a dislike of certain individuals or things, sometimes accompanied by great agitation or fainting, and usually attributable to physical causes or mental association. Thus many people have a great dislike to cats, whilst others cannot bear to hear anyone munching a raw apple.

Antiperiodics, drugs employed as remedies in certain forms of disease which recur periodically. The best example of an antiperiodic drug is that of quinine, which is so invaluable in the treatment of the recurring paroxysms of ague.

Antiphlogistic Treatment, that adopted with a view to reducing inflammation or fever; the term was more commonly used in the days of blood-letting than it is now.

Antiphon, the celebrated sophist, orator, and politician, was a native of Attica, and established himself in 430 B.C. at Athens, where he instructed Thucydides, who speaks of him with honour. He assisted in setting up the tyranny of the Four Hundred, and on its collapse (411 B.C.) he was put to death.

Antiphonal Singing (from the Greek, *anti*, against; *phonē*, the voice), the practice of chanting the Psalms verse by verse alternately. This custom is of very great antiquity, being used in David's time.

Antipodes (from the Greek *anti*, opposite, and *podes*, feet), a geographical term used to describe the relative positions of any two points on the surface of the globe so situated that a line drawn from the one to the other through the earth's centre forms a true diameter. The North Pole, for instance, is antipodal to the South Pole, and a small island in the Pacific (lat. 49° 32′ S., long. 178° E.) is antipodal to London. Such places have the same climate so far as that depends on latitude alone, but their hours and seasons are completely reversed. When it is midday at the one it is midnight at the other, and the midwinter of one coincides with the midsummer of the other. In a vague manner Australia and New Zealand are spoken of as our antipodes.

Antipyretics, remedies employed to reduce the temperature of the body in cases of fever. Quinine is the best example of an antipyretic drug; its chief use is in the treatment of ague, but it is also of value in other forms of fever. Again, salicylate of soda has a marked antipyretic action in cases of acute rheumatism. One of the most reliable means of reducing fever is the use of cold sponging or the cold bath.

Antipyrin, a drug prepared from coal-tar, and recently introduced for some of the same purposes as quinine. It is a febrifuge but not an antiperiodic.

Antiquary, one who is devoted to the study of relics of antiquity, such as inscriptions, books, coins, manuscripts, etc. The Society of Antiquaries of London was incorporated in 1751, that of Scotland in 1780.

Antique. [SCULPTURE.]

Antiquity of Man. Though, geologically speaking, man's appearance on the earth is but recent, various lines of evidence, historical, sociological, geological, and archæological, all point to an antiquity of the human race that when estimated in years can only be called immense. While Chinese and Chaldæan records probably carry back authentic history beyond 2,000 B.C., Egyptian hieroglyphics go back to at least 3,000 years before our era. The science of language, in indicating the derivation of whole families of languages, such as those of Europe and India, from a common stock, also involves a great draft upon the bank of time. Bricks and pottery are found below sixty feet of Nile mud, which probably only accumulates at the rate of a few inches in the century, and rude stone weapons, belonging apparently to some pre-Aryan race, are present throughout India. In Switzerland pile-dwellings are found in the mud of the lakes in which, below remains belonging to the period of Roman dominion or iron age, implements of bronze and of polished stone occur at successively greater depths. In Denmark, in addition to extremely ancient mounds of shells and bones known as *kjökken-mödding* ("kitchen midden"), successive layers of the peat are characterised by the beech, the chief tree of the country in Roman times as now, associated with iron implements, by oak associated with bronze, and by pine associated with polished stone or *neolithic* weapons. This points to the lapse of long periods marked by changes in climate. In England, France, and Belgium human bones and implements have in numerous cases been found in caverns under thick layers of stalagmite associated with the bones of animals either locally or altogether extinct, such as the wolf, hyæna, bear, horse, reindeer, and mammoth. These remains date backwards from a pre-Roman iron age, through the ages of bronze and polished stone, when a Mongolian race prevailed in north-west Europe, through a period of chipped flint implements known as the reindeer period, from the abundance of reindeer bones, to the *palæolithic* age, or period of the most ancient and rudest known chipped tools. Lastly, in the gravels and brick-earths of the rivers of the same area a similar succession is traceable, human implements occurring not only in association with mammoth, musk-ox and other animal remains, indicating cold conditions, but also under ice-borne detritus that marks at least the close of the glacial period. Though not as yet precisely estimable in years, these indications point to an antiquity which must at least be expressed in tens of thousands of years.

Antisana, a volcanic mountain near Quito in Ecuador, South America, having an elevation of 19,132 feet. A village bearing the same name stands on its flanks at the height of 13,500 feet, and is the highest inhabited place in the world.

Antiseptic, a substance used for preventing or arresting the spontaneous decomposition (fermentation or putrefaction) of animal and vegetable material. The kind of antiseptic which is required varies a good deal with the nature of the materials, each substance having—more or less—its own most fitting antiseptic.

The best known antiseptics are—(1) mineral acids, (2) common salt, (3) sugar, (4) spices, (5) ordinary alcohol, (6) some of the higher alcohols, especially phenol and thymol, (7) perchloride of mercury (corrosive sublimate). Perchloride of mercury has the reputation of being by far the most effective antiseptic; but is, unfortunately, a violent poison.

Antiseptic drugs are those which arrest putrefactive changes. Such changes are now known to be due to the growth of micro-organisms, which flourish luxuriantly in dead animal or vegetable matter. Antiseptics destroy the micro-organisms, and so prevent decomposition from taking place. Thus, anything which is inimical to the life of bacteria will have an antiseptic action. Some bacteria cannot live without a free supply of air; use is made of this fact in the preservation of tinned meats. Again, for the growth of micro-organisms an adequate supply of moisture is necessary, and this explains the readiness with which substances can be preserved when kept perfectly dry.

The modern treatment of wounds by antiseptic dressings presents one of the most important applications of these substances. The surface of a wound affords abundant scope for the development of bacteria, and in days gone by such development was of far too common occurrence, wounds becoming foul and assuming a sloughing and gangrenous appearance. The surgeon of to-day, however, by the adoption of the most scrupulous cleanliness, and the use of antiseptic dressings, prevents the growth of bacteria in the wound, and thus ensures much more rapid healing and largely diminishes the danger to life.

Again, antiseptics are largely employed in disinfection. Many, if not all the infectious diseases, are due to bacteria, and hence the importance of destroying such germs by disinfecting rooms, bedding, clothing, and the like.

Antiseptics are sometimes given internally to fever-stricken patients, but here their use is a limited one, for, unfortunately, those substances which act most powerfully upon germs have, as a rule, a poisonous action upon the human body likewise.

Antispasmodics, remedies employed to relieve spasm. Muscular cramps, for example, are removed by friction, and the pain of colic is lessened by the application of warmth to the abdomen. Among drugs which have an antispasmodic action, the chief are assafœtida, valerian, bromide of potassium, arsenic, hemlock, and stramonium.

Antisthenes, an Athenian philosopher of the fourth century B.C. He was a pupil of Socrates, for whom he deserted the sophist Gorgias. He is said to have avenged his master's execution by compassing the death of Melitus and the banishment of Anytus. The Cynic school was founded by him, and he insisted that virtue was the only thing worth pursuing. According to tradition, Socrates declared that his pride showed itself through the holes in his raiment.

Antithesis (from the Greek *anti*, against, and *thesis*, placing), a mode of expressing contrast of ideas by the juxtaposition of the words that express them. Macaulay's works afford numerous examples.

Antium, an ancient city of Latium, the birthplace of Caligula and Nero.

Antlers, the bony weapons of offence and defence on the heads of deer, as distinguished from the horns of other ruminants. These weapons, which, as a general rule, are shed at the close of the rutting season, and renewed in the following spring, are outgrowths from the frontal bones, covered at first with a soft integument known as "velvet," which dries up and peels off when the antler is formed. Antlers are the distinguishing ornament of the males, except in the Reindeer (*Cervus tarandus*), the female of which carries them in form resembling, but smaller than, those of the male, and in the Chinese Deer (*Hydropotes inermis*), in both sexes of which they are wanting. Each antler consists of a main stem or *beam*, and usually of one or more branches or *tines*. In the spring of the year after birth the beam only is developed, but in the next year the renewed beam throws out a branch—the brow-tine, to which the name antler was formerly confined. In the fourth year other tines are developed above the brow-tine, and so on, the antlers in many deer increasing in complexity after each successive fall, till more than sixty tines have been counted on the head of a red deer. In the fallow deer the beam is palmated or flattened out, as it was also in the extinct Irish Elk. Deer in which the permanent condition of the antlers was the same as that of deer of the third and fourth years described above, have been found in Miocene and Pliocene strata respectively—a fact worth noting in support of the theory that the history of the evolution of the individual is the history of the evolution of the race.

Ant-lions, MYRMELEONTIDÆ, a family of NEUROPTERA. The Ant-lion has gauzy wings like a dragon-fly, but it may at once be distinguished from the latter by its longer antennæ. They dig pits to entrap ants and other small insects.

Antommarchi, FRANCESCO, a physician of Corsican birth, but educated at Florence, who was selected in 1820 to attend Napoleon at St. Helena. He remained with him till his death, and refused to sign the report drawn up by the English surgeons. On his return to Europe he wrote *Les Derniers Moments de Napoléon*, and settled in Poland. He left Europe for America later, and died in 1838 or a few years later.

Antonelli, GIACOMO, Cardinal, born at the village of Sonnino on the Pontine Marshes in 1806. His father was apparently a timber merchant, but the name and family are ancient. Having received his education at the Grand Seminary at Rome and entered the priesthood, he was taken up by Pope Gregory XVI., and held several state offices. In 1847 he was created Cardinal by Pius IX. At first he seemed disposed to join the Liberal party, but soon changing his views he resigned office and retired with the Pope to Gaeta, where he took part in the negotiations that resulted in the re-occupation of the Vatican (1850). Thenceforward he acted as Foreign Minister to the Holy See until his death, opposing to the best of his power the unification of Italy and all other progressive measures. He raised a force to resist Garibaldi's attempt on Rome in 1867. The expulsion of the Austrians destroyed his chief hopes; the withdrawal of the French in 1870 shattered them still further.

and the abortive result of Arnim's mission left nothing for him but a policy of sullen protest. He died in 1876, leaving his vast fortune to be the subject of a *cause célèbre* between his acknowledged heirs and his reputed daughter, Countess Lambertini.

Antonello da Messina, an Italian painter, born in 1414. Happening to see a work in oil colours by Van Eyck, he went to Bruges to learn that artist's method, and returning to Italy in 1445 communicated the secret to Domenico Veneziano. In the latter part of his life he imitated so closely the style of his Flemish master that their works are not easily distinguished. He died in 1496.

Antoninus, a name borne by several Roman Emperors :—

1. ANTONINUS PIUS, whose other names were Titus Aurelius Fulvius Boionius Arrius, was born at Nemansus (Nîmes) in 86 A.D. He was educated by his maternal grandfather, Arrius, a trusted friend of Nerva. The young Antoninus, who possessed considerable abilities and a high character, strengthened by Stoic principles, served with distinction under Nerva, Trajan, and Hadrian, the latter adopting him as successor into the purple a few weeks before his death in 138. Antoninus reigned for twenty-three years over the vast Roman Empire, which during all that period enjoyed almost unbroken peace. He was distinguished for his equity, moderation, and simplicity of habits. Under him Christianity was allowed to develop without interference; the reform of Roman law was steadily carried out, and great public works were undertaken. His wife, Faustina, notorious for her profligacy, received from him more consideration and honour than she deserved. At her death she was deified and an institution for the education of destitute or orphan girls was raised to her memory. During this reign Lollius Urbicus built the wall of Antonine from the Firth of Forth to the Firth of Clyde as a barrier against the Keltic tribes of the North. Antoninus died at Lorium in 161.

2. ANTONINUS, MARCUS ÆLIUS AURELIUS VERUS, was born in 121 A.D., being the grandson of Annius Verus, and a member of a most distinguished family. Hadrian early marked him out for high place, and when he chose Antoninus as his heir, made him adopt Aurelius as his successor. The latter surpassed his adoptive father in virtue, and approached very nearly to the Christian standard, though he is credited on somewhat doubtful evidence with having permitted the persecution of the followers of Christ. His *Meditations*, which consist of notes made in his diary for his guidance in the affairs of life, testify to his sweet and noble character, his freedom from worldliness, his sense of duty, and his appreciation of the littleness of human things. He married Faustina, the younger, whose depravity rivalled that of her mother, and she was treated with no less leniency. Marcus Aurelius had a stormy reign. In his first year war broke out in Parthia and in Germany, and was threatening in Britain, whilst a devastating flood brought destitution in Rome, and was followed by a fearful pestilence. The Emperor was assiduous in relieving distress, in reforming laws, and in controlling their administration, whilst exercising keen vigilance in foreign and military affairs. To avoid excessive taxation he sold his imperial treasures. After defeating the Quadi and Marcomanni in 169, he visited the eastern provinces and returning to Rome received a triumph in 177, the famous column being erected in his honour. Fresh troubles broke out in Germany in 178, and Marcus, proceeding thither, defeated the barbarians, but worn out with fatigue and disease died in 180 either at Sirmium or Vienna.

For the other Antonines see COMMODUS, CARACALLA, and HELIOGABALUS.

Antoninus, WALL OF, a turf entrenchment, about 20 feet high, with an outer ditch, raised in 140 A.D. by Lollius Urbicus, the Roman Legate in Britain. It started from Douglas Castle, on th Clyde, and ran to Caer Ridden Kirk, on the Forth a distance of some 36 miles. Though always know by the name of Antoninus, this work, in point of fact, did but serve to connect the series of forts con structed by Agricola sixty years before. The line may now be traced in parts, and is called locally Grime's Dyke, or Graham's Dyke, Grim being the appellation of the devil.

Antonius, the name of a Roman *gens*, patrician and plebeian, to which belonged the following distinguished personages :—

1. MARCUS ANTONIUS, a famous orator, born B.C. 143, whose eloquence was highly praised by Cicero He served in Asia and Cilicia, was Consul in 99, took the part of Sylla in the civil wars, and was put to death by Marius and Cinna in 87 B.C. His treatise, *De Ratione Dicendi*, has perished.

2. CAIUS ANTONIUS, Hybrida, son of the above, served under Sylla against Mithridates, and appears to have been a mere brigand. Though his conduct was overlooked by Lucullus it brought upon him expulsion from the Senate.

3. MARCUS ANTONIUS (Mark Antony), the triumvir, was the son of M. Antonius Creticus, and grandson of the orator. Born in 83 B.C., he spent a dissipated youth. Then taking seriously to military matters he served with success in Egypt, in Gaul under Cæsar, and at the Battle of Pharsalia (44 B.C.). Cæsar rewarded him with varicus offices, and made him his colleague in the consulship. After the murder of his protector Antony, very popular with the soldiers and the people, obviously aimed at supreme power. The patriots, Brutus and Cassius, took up the cause of Octavius. Antony besieged Decimus Brutus in Mertina. Here he was defeated, but the consuls being slain Octavius was left in sole command, and he, deserting his allies, united with Antony and Lepidus to form the second Triumvirate. Bloody proscriptions terrified Italy for some months, Cicero being one of the most illustrious victims. Then followed the defeat and death of Brutus and Cassius at Philippi, in 42 B.C., and Antony went into Cilicia, where he met the beautiful Cleopatra, Queen of Egypt, and last of the Ptolemies. He was ensnared by her charms, as Pompey and Cæsar had been before him, and he gave up all care for public affairs to pursue a

life of pleasure at Alexandria. His wife, Fulvia, stirred up Octavius against him, but they were soon reconciled. Fulvia died, and Antony cemented the reconciliation by marrying Octavia, his colleague's sister. But his infatuation for Cleopatra drew him again to Egypt, and Octavius, being incensed, took up arms in earnest. The naval battle of Actium ensued (31 B.C.), and Antony, defeated, is said to have ended his life shortly after by falling upon his sword. Shakespeare, in his *Julius Cæsar* and *Antony and Cleopatra*, has powerfully depicted two phases of his character.

Antony, ST., (1) OF THEBES, called the Great. He was born about 250 A.D., and early embraced a religious life. Selling all his possessions, he retired into the desert where he remained for twenty years. To this period are assigned the various legends of his temptations by the devil, and the story of his preaching to the fishes. In 305 he founded a monastery, and in 356 he died at an advanced age. (2) OF PADUA, a Franciscan monk born 1195, and an ardent supporter of his order. He died in 1231, and was canonised in the succeeding year.

Antraigues, EMANUEL LOUIS HENRI DELAUNAY, COMTE D', a French author, born in 1765. He wrote in 1788 a *Mémoire sur les États Généraux*, which aided the revolutionary movement. However, on being elected Deputy he changed his views, upheld the royalist cause, and was exiled in 1790. After the Treaty of Tilsit he revealed to Canning's Government the existence of the famous secret clauses. His Italian servant informed Napoleon of this act, and then, fearing consequences, murdered the count and his wife in London (1812).

Antrim, a county in the province of Ulster, Ireland, bounded north and east by the sea, south by Belfast Lough and the river Lagan, west by Lough Neagh and the counties Down and Londonderry. It is about 54 miles long by 28 broad, and has an area of 1,191 square miles. Towards the east bogs and mountains prevail, rendering some 120,000 acres sterile, but about two-thirds of the soil is arable. The prosperity of the county depends, however, on the manufacture of linens, which is carried on at Belfast, Lisburn, Larne, Ballymena, Ballymoney, Carrickfergus, and Antrim. There are large ironworks, too, and the fisheries are good, whilst the inland districts supply large quantities of butter. The masses of columnar basalt, known as *The Giants' Causeway*, form a remarkable natural feature, and the county is rich in Celtic antiquities. The inhabitants are mainly Protestant colonists from England and Scotland. Pop. (1901), 461,634. Antrim town is at the north extremity of Lough Neagh, 13 miles north-west of Belfast.

Ants, or FORMICIDÆ, are a family of HYMENOPTERA. They live in communities composed of three different sexes, viz. males, females, and neuters. The males and females are both winged, but are found only for a short period every year, as after pairing the males die, and the females lose their wings. The neuters, of one or more classes, are wingless; they are produced from underfed female larvæ, and the ants regulate the proportions of females and neuters by varying the food supply to the larvæ. The neuters do the whole work of the community. The males are stingless. The queens are fertile females. Like most social animals they are remarkably intelligent, and it is now generally admitted that many of their operations are controlled by reason and not by instinct. Thus some ants, *e.g. Atta*, store up grain for the winter, and prevent its germination by gnawing the radicle; others, *e.g. Ecitom*, the foraging ant, make organised attacks on the nests of other ants, remove the larvæ to their own, and make the young into slaves; others again, as *Hypoclinea*, keep aphides for the sake of their milk; and some South American ants make tunnels under wide rivers. The "White Ants," or *Termites*, are not true ants, but belong to the *Neuroptera*.

Ant-thrushes (*Pittidæ*), a family of beautifully coloured thrush-like birds, most abundant in the Malay Archipelago, attaining their maximum of beauty and variety in Borneo and Sumatra.

Antwerp (Fr. *Anvers*), the chief town of the province of the same name in Belgium, was founded in the seventh century A.D., on the right bank of

ANTWERP CATHEDRAL. (*From the Place Verte.*)

the river Scheldt, about 50 miles from the sea. The numerous canals greatly facilitate the shipping and unshipping of goods which pass to and from every quarter of the globe, and steam communication exists with all foreign countries. The cathedral is one of the finest Gothic buildings in North Europe, and contains three masterpieces of Rubens. It has six aisles, and is 500 feet long by 250 feet broad. In the church of St. James the painter himself is buried. The Hôtel de Ville, the Hôtel of the Hanseatic League, and the old house of Plantins the

printers are interesting architectural monuments. Perhaps the best thing that Antwerp possesses is its noble picture gallery, thoroughly illustrating the development of Dutch and Flemish art. For three or four centuries after its foundation Antwerp, though prosperous, suffered from the Normans, from fires and from plagues, and never stood out as one of the first ports of Europe till the 12th century. A little later it joined the Hanseatic League, and from that date until the closing of the Scheldt in 1648, it grew steadily in wealth and population, though the Spanish armies twice captured it. On one of these occasions (1576) what was known as "the Spanish Fury" raged with such disastrous effect that the traces of it can be clearly distinguished to this day. In 1792 the city passed into French hands, and Napoleon did all he could to make it a rival port to London. In 1814 Antwerp was surrendered by the Treaty of Paris, a previous attempt to take it having failed. It was then assigned to Holland. When Belgium claimed its independence in 1830 Antwerp was held by the Dutch garrison, and had to be reduced by bombardment in 1832. Since that date it has belonged to Belgium.

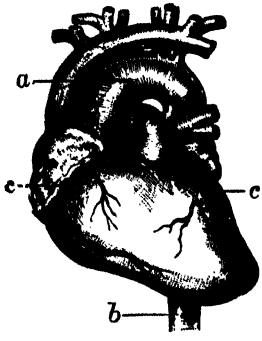
Antwerp Blue, a mineral pigment prepared by precipitating Prussian blue in combination with alumina. It is therefore essentially a diluted variety of Prussian blue.

Anubis, or ANEBO, one of the deities of ancient Egypt, son of Osiris and Isis. He is represented with a jackal's head on a human body. His functions were similar to those of Hermes or Mercury, viz. to conduct souls into the unknown world, and to preside over the change from day to night.

Anwari, a Persian poet, who flourished in the twelfth century. The Sultan Sandjar, last of the Seljukian dynasty, was his patron, and his compositions were satirical, amatory, and elegiac.

Aorist, the tense of the Greek verb which corresponds to the English simple past.

Aorta, the main arterial trunk of the body. It rises from the left ventricle of the heart, and after forming an arch across the chest, descends in front of the vertebral column until it reaches the level of the fourth lumbar vertebra, where it divides into the two common iliac arteries. It gives off branches in its course, which supply the head, neck, arms, and trunk, while the iliacs, its terminal divisions, supply the pelvis and lower limbs. [BLOOD-VESSELS.] At the junction of the aorta and left ventricle are the aortic or semilunar valves, which only allow of the passage of blood from the ventricle into the aorta, and prevent a flow in the opposite direction from occurring. Just above the aortic valves are the coronary arteries, by means of which the heart itself is supplied with arterial blood. The aorta is subject to various diseases, notably to aneurism (q.v.) and atheroma (q.v.).



AORTA.
a, Arch of aorta; *b*, thoracic aorta; *c*, coronary arteries.

Aosta (classic *Augusta Prætoria*), a town in the province of Turin, Italy, situated in a lovely Alpine valley on the left bank of the river Dora Baltea, and nearly 2,000 feet above sea level, at the point where the descents from the Great and Little St. Bernard unite. The remains of an amphitheatre and a triumphal arch, with other traces of Roman occupation, still exist. St. Bernard was archdeacon here, and Anselm of Canterbury was a native of this place. The valley is fertile and produces rice, cheese, and hemp, but the inhabitants are terribly afflicted with goitre and cretinism. There are mineral springs in the neighbourhood. The district, formerly a duchy, bears the same name as the town.

Aoudad (*Ovis tragelaphus*), a wild sheep of North Africa, inhabiting the lofty woods of the Atlas range. It stands about three feet high at the shoulder, is reddish brown in colour, with a heavy fringe of hair reaching from the neck to just about the hoofs; horns about two feet long. Called also the Barbary Sheep.

Apaches, a North American Indian nation, the most bloodthirsty of all Indian tribes, southernmost branch of the Athapascan family, from whom they are separated by a space of nearly 1,000 miles. The Apaches are ferocious nomads who roamed over the region between the Rio Pecos and the Colorado desert, east and west, and from Utah, through Arizona, New Mexico, and West Texas, southwards to the Mexican States of Chihuahua and Sonora. But in recent years the area of their depredations has been steadily diminished. There are now (1910) only about 6,000, and these since 1903 have been gradually congregated into reservations or brought under agency control. They are divided into numerous tribal groups or clans, commonly known by such Spanish names as Tontos, Llaneros, etc. But the collective national name is *Shis Inde*, "men of the wood," the word *Inde* being the same as Tinney, "men," applied generally to the Athapascan family. Like all the Tinney languages Apache is extremely harsh, full of unpronounceable gutturals and grunts. A few Apaches have abandoned the nomad state, and are now settled in the Indian territory between the Washita and Red River. Detailed descriptions of the Apaches are given by Ross Browne (*Adventures in the Apache Country*, Washington, 1869), by C. Cremony (*Life among the Apaches*, San Francisco, 1869), and F. W. Hodge (*Handbook of American Indians*, Washington, 1907).

Apatin, a town in Hungary, on the left bank of the Danube, 125 miles due south of Pesth, and near the point where the river turns east. There are silk and cloth factories and large dye-works.

Apatite (so-called from the Greek *apate*, deception, from having been formerly mistaken

for emerald), a phosphate of lime with a chloride and fluoride ($3Ca_3P_2O_8+Ca(Cl,F)_2$). It is usually green, a translucent variety being known as *asparagus-stone*. It crystallises in hexagonal prisms, commonly occurring in needles in igneous rocks; and it is five in Von Mohs' scale of hardness. When abundant it is valuable as a source of superphosphate for manure.

Apatura, a genus of butterflies with iridescent wings. The Purple Emperor (*A. Iris*) is a common English species.

Ape. Popularly this term is applied to any tailless monkey; zoologically it is used for any individual of the middle group of the Primates (q.v.), thus excluding man in the ascending, and the Lemurs, or half-apes, in the descending scale. According to this definition the apes consist of two families:—1. Simiidæ, with three sub-families—(1) Simiinæ (the Anthropoid apes), (2) Semnopithecinæ (Slender apes), and (3) Cynopithecinæ (Baboons), all from the Old World. 2. Cebidæ, with five sub-families—(1) Cebinæ (Spider monkeys, Woolly monkeys, and Sapajous), (2) Mycetinæ (Howlers), (3) Pithecinæ (Sakis), (4) Nyctipithecinæ (Night apes), and (5) Hapalinæ (Marmosets), all from the New World. Some authorities exclude the anthropoid apes from their definition.

Apeldoorn, a town in the province of Guelderland, Holland, on a tributary of the Yssel, 17 miles north of Arnheim. Loo, the country house of William of Orange, is close by. Apeldoorn has large paper-mills.

Apelles, the most famous of Greek painters, was the contemporary and friend of Alexander the Great, of whom he is said to have painted several portraits. He was probably a native of Colophon, though some consider that the island of Cos, where he lived and died, was also his birthplace. His great but unfinished work, *Venus Anadyomene* (rising from the sea), was bought by Augustus from the people of Cos and placed in the temple of Cæsar. Though a man of pleasure, he was very industrious, and, according to Pliny, gave rise to the proverb "Nulla dies sine lineâ," whilst "Ne sutor ultra crepidam," the Latin version of his reply to the cobbler who criticised the legs as well as the shoes of one of his figures, is no less widely known. There is a tradition that a picture in the Louvre, copied from a Roman fresco, *Nuptiæ Aldobrandinæ*, hands down some faint reflection of this master's style.

Ape-men, a term used to translate Häckel's Pithecanthropi, his name for a group which he assumes to have been intermediate between the anthropoid apes and man, and the immediate ancestors of the latter.

Apennines (Kelt. *Pen*, summit) the name given to the whole mountain system of Italy, which extends from the Maritime Alps, near Genoa, to Cape Spartivento, a length of some 800 miles, and reappears again under another name in Sicily. The average height of the chain is about 4,000 feet, but it sinks below that in the north, whilst in the Abruzzi it rises to 7,000 feet. The highest peaks are Monte Corno (9,593), Monte Cornaro (8,960), and Monte Velino (7,910). The Apennines are divided into three sections:—1. The Northern, terminating at Monte Cornaro. 2. The Central, reaching as far as Monte Velino, and throwing out lateral ranges into Tuscany and Roumania. 3. The Southern, which includes Monte Corno and Vesuvius, and bifurcates near Acerenza, stretching one limb towards Reggio and the other towards Otranto. Unlike the Alps or the Pyrenees, this range displays swelling undulations, unbroken by bare rocks or jagged peaks except in the loftier regions. It presents the same geological features generally as the Alps. The main axis shows Secondary formations from the trias to the upper chalk, while the minor ranges are composed of Tertiary strata, Eocene, Miocene, and Pliocene beds being well developed, especially in the north. Volcanic action, ancient or recent, is everywhere to be recognised, in crater lakes, such as those of Albano and Nervi, in Solfatara and other chemical deposits, in marble quarries, in caves and grottos and mineral springs, and in the periodical eruptions of Vesuvius and Etna. The southern tributaries of the Po, the Arno, the Tiber, and the Volturno, take their rise in this watershed.

Aperients. [PURGATIVES.]

Ape's Hill, a promontory on the coast of Morocco, opposite to Gibraltar. It was one of the classical "Pillars of Hercules," Calpe, or Gibraltar, being the other.

Apetalous (*without petals*), a descriptive term in botany applicable to many flowering plants besides the large series known as *Apetalæ* or *Incompletæ*, which includes, among others, the great groups of the *Amentaceæ* (q.v.), and the *Urticaceæ* or nettle family.

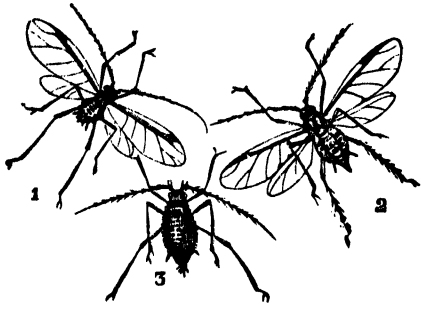
Aphaniptera, an order of insects with the wings reduced to mere scales; the mouth is suctorial and the metamorphosis complete. The flea (*Pulex irritans*) is a fairly well-known member of this order. None are known fossil.

Aphasia, the loss of power of speech, arising not from a lack of ideas, nor from any defect in the muscles of the larynx, tongue, etc., but from an interference with the functions of the so-called speech centre in the brain. This centre is situated in the lower and hinder portion of the frontal lobe of the brain on the left side; it is known as Broca's centre, being named after the man who first insisted upon the relation of this part of the brain to speech. It is a well established fact that the left side of the brain is associated with movements of the right side of the body, and consequently interference with the speech centre is commonly accompanied by paralysis of the right arm and leg. The most common cause of aphasia is some interference with the circulation of blood through the middle cerebral artery which supplies Broca's centre; either by rupture of the vessel, or by its becoming occluded by disease. Thus aphasia is a common symptom in apoplexy (q.v.), being then associated

with right hemiplegia (q.v.). Aphasia may be partially recovered from, either by the re-establishment of the functions of Broca's centre, or, in other cases where that part of the brain is irreparably damaged, it is supposed that the corresponding portion of brain on the right side is capable of taking on the functions of a centre for speech.

Aphelion, the point in the orbit of a planet which is farthest away from the sun; opposed to the *perihelion*, the point nearest the sun.

Aphides, the plant lice, a family of HYMENOPTERA (q.v.). They are minute in size, but occur in such enormous numbers as to do serious injury to the plants on which they live; their numbers are kept in check mainly by the lady-birds. They secrete a milky juice, to obtain which they are kept captive and milked by ants. They are HEMIMETABOLIC, *i.e.* they undergo only a partial metamorphosis. They are of interest biologically as one of



APHIDES (*Siphonophora Millefolii*).
1 Winged male. 2. Winged viviparous female.
3. Wingless viviparous female.

the type cases of that alternation of sexual and asexual methods of reproduction known as PARTHENOGENESIS; during the summer the *Aphides* are sexless and they reproduce asexually, but in the autumn a generation of males and females is produced; these copulate and lay eggs, which in the following spring are hatched into the asexual forms. The type genus is APHIS.

Aphis-lions, the Hemerobiidæ, a family of NEUROPTERA.

Aphonia, loss of voice.

Aphorism, a short pithy saying in which a maxim or principle is expressed very tersely. Familiar examples are, "A soft answer turneth away wrath," "More haste, less speed."

Aphrocallistes, one of the few surviving genera of HEXACTINELLIDA, *i.e.* sponges of which the skeleton is composed of six rayed siliceous SPICULES; it is a deep sea dweller. It is a close ally of the "Venus's flower-basket" (q.v.).

Aphrodita, the sea-mouse, an ANNELID of the order ERRANTIA, common round the English coast; it is covered by a dense felt of interlacing setæ or bristles, which renders it iridescent.

Aphrodite (from the Greek *aphros*, foam), the goddess of love among the Greeks; she was fabled to have sprung from the sea-foam, and thus obtained her name. She is supposed to have been identified with the Phœnician Astarte and the Roman Venus, although the original Greek conception of Aphrodite was much purer than the later Venus of Rome.

Aphthæ, a name applied to the small white patches which are sometimes seen on the tongue, lips, and cheeks, and which are now known to be due to the growth of a fungus, the *Oidium albicans*. Aphthæ are not uncommon in suckling children. [THRUSH.] In adults they are rarely seen, and only in conditions of extreme exhaustion produced by such diseases as typhoid fever or consumption.

Apiary. [BEE-HIVE.]

Apical Cell, a large cell at the apex, or growing point, of the axis (q.v.) in cryptogamic plants, from the repeated subdivision of the basal portion of which the axis grows. In flowering plants it is replaced by a group of small thin-walled cells.

Apical System, the system of plates found in the ECHINOZOA, regarded as homologous with the basals and radials of the CRINOIDEA. They are usually ten in number, and arranged in a double circle, in the centre of which the anus opens (as in the common Sea Urchin). The plates of the inner circle are known as the costals or basals, and the outer the radials.

Apicius. By a curious coincidence three Roman *gourmands* claim this name. The first lived in the days of Sylla, the second under Augustus and Tiberius, the third under Trajan. The second (M. Glabrius) is the most celebrated. Having spent about a million on good living, and finding he had only £80,000 left, he committed suicide rather than face moderate fare. The treatise *De Re Culinariâ*, bearing the name of Cœlius Apicius, may be the work of the last of the three.

Apidæ, the family of Hymenoptera comprising the BEES (q.v.).

Apiocrinus, the Pear Encrinite, the typical genus of the APIOCRINIDÆ, a family of Crinoidea (q.v.), which lived in the geological periods of which the oolites and the chalk are the best-known examples.

Apion, an Alexandrian grammarian of the first century, who wrote a commentary on Homer and taught rhetoric in Rome. He was employed to plead before Caligula in favour of depriving the Jews of their privileges in Alexandria (A.D. 39). Josephus refuted his misrepresentations in a well-known work.

Apis, the sacred bull of Egypt, the seat of whose worship was at Memphis. This deity was not a mere abstraction, but took concrete form as a black bull bearing a white square on the

brow, the figure of an eagle on the flank, and a scarabæus under the tongue. After twenty-five years the animal was solemnly drowned in the Nile, and embalmed, and a period of mourning ensued till a properly-marked successor was found. It is said that Osiris took the shape of a bull and was harnessed to the plough. Probably the cult

APIS.

may have originated in the primitive rites of an agricultural people, and possibly there may be some connection between the Egyptian and the Brahminical veneration for the bovine species. The Golden Calf of the Israelites was undoubtedly a reminiscence of Egyptian customs.

Apis, the genus of social bees, which includes the honey bee (*A. mellifica*). [BEE.]

Aplysia, the Sea Hare, a slug-like gastropod (q.v.) with a thin transparent internal shell. It lives among seaweed below the low-tide line. It is the type of the family Aplysiadæ, which belongs to the Opisthobranchiate (q.v.) group of the Aplysiadæ, a family of Gastropods, as the breathing organs (branchiæ) are situated behind the heart.

Apneumona, a sub-order of APODA (Holothuria), including those without respiratory trees, Cuvierian organs, and radial water vessels. An explanation in the terms is given under Holothurians.

Apnœa, in its strict use a diminution of the extent of the respiratory movements or their temporary complete cessation brought about by saturating the blood with oxygen. Apnœa is, however, used by some as though it were synonymous with Dyspnœa (q.v.).

Apocalypse (Greek, *unveiling*), a name very frequently applied to the Revelation of St. John, the last book of the New Testament Scriptures.

Apocarpous, having the carpels distinct, a term applicable, for example, to the fruit of the family *Ranunculaceæ* and of many *Rosaceæ*, such as the bramble (*Rubus*), in which each carpel resembles a plum in miniature, and the strawberry, in which the dry, one-seeded carpels are scattered over a fleshy outgrowth.

APOCARPOUS. (*Fruit of bramble.*)

Apocrypha (Greek, *secret*), the name given to those books of the Old Testament which are found in the Septuagint or Greek Testament, but not in the Hebrew. They are as follows:—The Third and Fourth Books of Esdras; Book of Tobit; Book of Judith; rest of the Book of Esther; Book of Wisdom; Jesus, the Son of Sirach; Baruch the Prophet; Song of the Three Children; Story of Susanna, of Bel and the Dragon; Prayer of Manasses; First and Second Books of Maccabees. The name probably means that their date or authorship is obscure. Hence the term "apocryphal" is often applied to spurious literature.

Apoda, (1) a sub-order of CIRRIPEDIA (the barnacles and their allies), in which the shield (or more strictly the carapace) is reduced to two threads, and there are no cirri or appendages. It includes the genus PROTEOLEPAS. (2) The order of HOLOTHUROIDEA including those without tube feet.

Apodemata, the internal ridges which mark the line of junction of two plates in the carapace or shell of a crustacean, hence it is often possible to determine that a particular area has been formed by the union of two or more parts originally distinct, by finding these structures.

Apodictic, in *Logic*, that proposition whose contradictory is inconceivable.

Apogamy, the omission of the oophore stage, or sexual generation, in alternation of generations, as when some ferns abnormally produce a new fern-plant (or sporophore) by direct growth from the prothallus (the first result of germination) without the usual formation of archegonia and their fertilisation by antherozoids (q.v.). In the mushroom and its allies (*Hymenomycetes*) apogamy may have become normal, the spawn (or mycelium) giving rise directly to the mushroom (or sporophore) and no sexual organs being formed.

Apogee, the point in the earth's elliptical orbit at the greatest distance from the sun. The term is also applied to the corresponding point in the moon's orbit round the earth.

Apolda, a town in the grand duchy of Weimar, Germany, is situated on the river Ilm, nine miles east of the town of Weimar. The railway between that place and Berlin passes through it. There are hot mineral springs, and large factories for the weaving of cloth and hosiery.

Apollinaris, SIDONIUS, was born at Lyons in 430 A.D. He married a daughter of Avitus, afterwards Emperor of Rome. Having entered the Church he became Bishop of Clermont, and wrote several theological works, dying in 484.

Apollinaris, or APOLLINARIUS, of Alexandria, was a learned Christian of the fourth century. Both he and his son were excommunicated for associating with heathen scholars, but they were pardoned, and the son was subsequently Bishop of Laodicea. When the Emperor Julian forbade (362) the reading of the classics, they turned the greater portion of the Scriptures into verse or Platonic dialogues. Only a few fragments of their work are extant.

Apollinaris Water, a mineral water containing carbonate of soda, found in the Ahr valley in the Rhine province. It is much used as a table beverage. A church near by, dedicated to St. Apollinaris, suggested the name.

Apollo, or PHŒBUS, was, in classical mythology, the son of Zeus, or Jupiter, and Latona. Originally a personification of the sun, he assumed in course of time more complicated functions, presiding over music, poetry, eloquence, and medicine, besides exercising the divine gift of prophecy. Shepherds, too, and founders of cities were under his special care. He had the title Pythius, because by his shafts he freed his mother from the attacks of the Python. His appearance, as conceived by painters and sculptors, was that of a man in the prime of beauty, tall, beardless, exquisitely proportioned, and carrying either a bow or a lyre. Parnassus and Tempe were among his favourite haunts, but Delphi was his true home, and his oracle there commanded for many centuries the veneration of the world. He had temples also in Delos, Claros, Tenedos, and Patara, and the Colossus at Rhodes was dedicated to him. Artemis was his twin sister. In the early religion of Rome there can be found no trace of this divinity, but his worship was early introduced from Greece, and became strongly rooted in the national customs. The famous statue in the Belvedere of the Vatican, though not of the best period of art, has furnished the popular idea of the god to later generations.

Apollodorus, (1) a famous Greek painter who flourished at Athens, about 408 B.C., and was a contemporary of Zeuxis. (2) A learned grammarian of Alexandria, in the second century B.C. He was a pupil of Aristarchus. (3) A great architect, born at Damascus in 60 A.D. He built for Trajan the stone bridge over the Danube, and the column in the Forum, besides other splendid works. He is said to have been put to death by Hadrian in 130.

Apollonius, (1) of Rhodes, a Greek poet, who was born at Alexandria or Naucratis, about 276 B.C. He is reputed to have been first the pupil and afterwards the rival of Callimachus, who caused his exile to Rhodes. After the death of his enemy he returned to Egypt, and was made guardian of the great library of Alexandria. Only one of his works has come down to us, viz. the *Argonautica*, an epic in four books, from which Virgil borrowed. He died about 186. (2) Of Tyana, in Cappadocia, a philosopher of the first Christian century, who seems to have combined mysticism and magic with the cult of virtue. His birth in 4 B.C. was alleged to have been attended by miraculous signs. He studied at Tarsus and Ægæ, adopting the moral and religious principles of Pythagoras for his guidance. He then seems to have travelled as a teacher over the greater part of the known world, visiting India and Æthiopia, and going to Rome in Nero's time to see "what sort of a beast a tyrant was.' He enjoyed the esteem of Vespasian and Titus, but was charged with conspiracy against Domitian. He was taken to Rome, refuted his accusers, and returned by magical means. Afterwards he prophesied the emperor's assassination. He died about 96 A.D.

Apollos, an Alexandrian Jew, who, after acquiring a thorough knowledge of the Old Testament (Acts xviii. 24), came under the influence of John the Baptist's teaching, and about the middle of the first century embraced Christianity at Ephesus. He then received fuller instruction from Aquila and Priscilla. At Corinth, where he watered the seed sown by Paul, his popularity was so great that his followers appear to have sought to establish a sect of their own (1 Cor. iii. 4–7). Apollos, disgusted, left Corinth, and probably gave full information to Paul, who generously wished him to return. He is thought by many to be the author of the Epistle to the Hebrews.

Apollyon (Greek, *destroyer*), a name given to the king of the army of locusts, and the angel of the bottomless pit in Rev. ix. 11, where the Hebrew equivalent is stated to be Abaddon. The adoption by Bunyan, in the *Pilgrim's Progress*, of this title for the enemy of man, has made it yet more familiar to English readers.

Apologetics, that branch of Christian theology which treats of the establishment and defence of Christianity.

Apologue, a story or fable in which some moral precept is impressed upon the hearer. It differs from a parable, in that the latter is confined to incidents which have some probability, whereas an apologue is absolutely unlimited.

Apology, originally, the defence made by anyone against an accusation; in this sense it is used by Plato in the "Apology of Socrates." Later, the term was used by Christian writers much in the same meaning, for a defence of Christianity against all opponents. Now, however, the word has quite a different meaning, and signifies admission of a fault, for which a slight humiliation is due.

Apophis (*Apap*, an Egyptian word, signifying a giant), the great serpent which the ancient Egyptians took as a type or personification of evil, and which Horus is represented as having destroyed. From this myth the Greeks borrowed the story of the destruction of the Python by Apollo, and of the wars between the giants and the gods.

Apophthegm, a terse, concise maxim, rather more practical than an aphorism (q.v.).

Apophyllite, a hydrated silicate of calcium and potassium, named from its flaking before the blow-pipe. Large white crystalline masses of this mineral are found at Poonah and Ahmednágar, in India.

Apoplexy, a word the meaning of which it is not easy to define; it is used in varying senses by

different authorities, and much confusion has in consequence resulted. In its original use it denoted simply a "stunning" or "stupor" produced by internal disease. The old physicians recognised a form of seizure in which disablement of body, mind, or both suddenly supervened, usually in persons who had passed the prime of life, and altogether apart from injury, poisoning, epilepsy, or other known causes of such a condition. To this class of cases the term "stroke," "apoplectic stroke," or simply "apoplexy" was applied. It was subsequently discovered that one of the commonest causes of such a seizure was the rupture of an artery within the brain, leading to effusion of blood into the cerebral substance. Hence apoplexy came to signify an extravasation of blood, and by an unfortunate extension of its meaning (in defiance of the etymology of the word) it was applied indiscriminately to any such extravasation, in whatever part of the body it might occur. Thus arose the terms cerebral apoplexy, pulmonary apoplexy, and the like.

In cerebral apoplexy the symptoms are very variable, differing according to the part of the brain which is affected. There is usually sudden loss of consciousness, accompanied by hemiplegia (or paralysis of one side of the body). The state of stupor may become more and more pronounced, with stertorous breathing, and may end in death; or recovery of consciousness may take place, though in that event loss of power of movement, loss of speech or some other defect usually remains. [APHASIA, HEMIPLEGIA.]

Rupture of a cerebral artery is due to degeneration of the arterial coats; it is particularly liable to occur in the subjects of the disease known as chronic interstitial nephritis (q.v.). The old notions that stout, short-necked persons are especially liable to apoplexy rests on no secure foundation.

A patient who has had one apoplectic attack is always liable to another. Popular pathology says that the third "stroke" is always fatal; this is, however, by no means necessarily the case. The treatment of a fit of apoplexy consists in securing absolute rest with the head raised. The application of cold, the administration of purgatives, and in some cases blood-letting are also of service.

Aporosa (*without pores*), the sub-order of MADREPORARIA, in which the walls of the skeleton are solid instead of being porous. It includes the most highly developed of existing corals. [CORAL.]

Aporrhais, the spout shell, a genus of GASTROPODA, of which one species, *A. pes-pelecani*, is common round the English coast.

Apospory, the omission of the sporophore (or non-sexual) stage in alternation of generations, which is at present only known to occur abnormally in some ferns, in which a rudimentary prothallus (q.v.), bearing archegonia, is borne on the back of the frond, in place of the usual sporangia. [APOGAMY.]

Apostate (Greek, *one who stands away from*), one who abandons the religion he has formerly professed; frequently used of those who abandoned Christianity from unworthy motives, such as fear of persecution or desire of gain. The Emperor Julian, however, to whom the epithet was applied, abjured Christianity from purely conscientious motives.

A posteriori (Lat., *from that which is after*), in *Logic*, an argument which reasons backwards from effects to causes, or from particular facts to general laws. Thus the term is commonly applied to Induction as contrasted with Deduction. [A PRIORI.]

Apostle (Greek, *one sent forth*), the name given by Christ to twelve of His disciples, whom He designated as His messengers. They were named Simon Peter, Andrew, James, John, Philip, Bartholomew, Thomas, Matthew, James the Less, Simon the Canaanite, Jude, and Judas Iscariot. St. Paul and Barnabas were afterwards spoken of as apostles. The lists vary slightly in the different Gospels.

Apostles' Creed, the common formula of Christian belief commencing, "I believe in God, the Father Almighty." It was for some time attributed to the Apostles, but modern criticism shows it to be of later authorship.

Apostle Spoons, spoons having at the end of each handle the carved figure of an Apostle. They are frequently given as christening presents.

Apostolic Brethren, the name given to various sects which professed to live after the manner of the Apostles. The most notable was founded by Segarelli of Parma in 1260. In 1300 Segarelli was executed, and was succeeded by Dolcino, who, however, after a desperate resistance was taken by Bishop Raynerius, and was burnt in 1307. The doctrines of the Brethren were renunciation of marriage, property, and all worldly ties, and denunciation of papacy and the corruption of the Church.

Apostolic Canons, eighty-five ecclesiastical rules, erroneously ascribed to Clemens Romanus (q.v.). They afford valuable insight into the discipline of the Oriental churches of the second and third centuries.

Apostolic Churches, churches established by the Apostles; specially applied to those of Rome, Alexandria, Antioch, and Jerusalem. The term is also claimed by the Roman Catholic Church and the Church of England.

Apostolic Constitutions, a collection of rules for the Church, attributed, like the Apostolic Canons (q.v.), to Clemens Romanus.

Apostolic Fathers, Clemens, Barnabas, Polycarp, Ignatius, and Hermas: so called because they actually came into contact with the Apostles during their life-time.

Apostolic Succession, the theory of the unbroken succession of bishops and episcopally ordained clergy from the Apostles themselves down to the present day. The Roman Catholics,

and many members of the Church of England believe that such succession is absolutely essential to any pastoral office.

Apostrophe (Greek, *a turning away*), in *Rhetoric*, a figure of speech in which the speaker breaks off from his address to the audience and makes an appeal to some individual either present or absent, or to some thing animate or inanimate. This form of oratory is frequently used by the poets. The term is also used to designate the mark (') for one or more letters omitted, as *tho'* for *though*, *'twas* for *it was*, and especially in the possessive case where an *e* is dropped out, as "*Lord's*" for "*Lordes*."

Apothecary, a term applied until comparatively recently to a member of the inferior branch of the medical profession. In 1606 the apothecaries of London were, together with the grocers, incorporated by James I.; but in 1617 they were freed from this combination. At this time they were allowed to dispense and sell medicines, but not to prescribe: this injunction was removed in 1703, while in 1815 an Act was passed giving the Society of Apothecaries the privilege of licensing and examining all such medical men as dispensed drugs in England and Wales. Later legislation, however, has amended this law in several respects, apprenticeship, which was formerly essential to the would-be practising apothecary, no longer being necessary.

Apothecium, the fructification in one division of the fungi, consisting of an open cup or disc lined with hairs (*paraphyses*) and spore-cases. The Lichens belong here.

Apotheosis, the deification of a mortal, either by ascribing to him divine ancestry or by actual enrolment among the gods, though these two conditions are often found together, as in the case of Romulus:—

> "Born from a god, himself to godhead born,
> His sire already signs him for the skies,
> And makes his seat amidst the deities."

Under the first head fall the demigods of classic mythology [HEROES, HERO-CHILDREN], and the sacred sovereigns of ancient Peru, China, and Japan, the fancied descendants of the Sun or Moon. The best instances of the latter form are historical. In Egypt the Pharaohs and the Ptolemies were venerated, and Alexander claimed to be a son of the Zeus who, clothed with a ram's skin, showed himself to Herakles. Suetonius tells how Julius Cæsar was deified after death, not merely by a formal decree, but "by the firm belief of the common people;" and how, when the body of Augustus was burning, "a man of prætorian rank swore that he had seen the shade of the emperor ascending up into heaven." Thus the custom was introduced that on the decease of every emperor the Senate should place him in the number of the gods, and the ceremonies of his deification were blended with those of his funeral. There are two noteworthy developments of apotheosis: (1) Hagiolatry (q.v.) as practised in the Roman, Greek, and African Churches (with the curious modification of it in the cult of the Positivists) (q.v.); and (2) the belief that "Divinity doth hedge a king," and to this belief, in its turn, are due the doctrines of passive obedience and "the right divine of kings to govern wrong." The term is used figuratively to signify excessive honour paid to any distinguished person, or the personification of a principle or idea.

Appalachians. [ALLEGHANIES.]

Appalachicola, (1) a river that flows for seventy miles through the State of Florida, U.S.A., and falls into St. George's Sound in the Gulf of Mexico. It receives one or two considerable tributaries (2) A seaport at the mouth of this river.

Appanage, or APANAGE, originally the provision of lands or feudal superiorities assigned by the kings of France for the maintenance of their younger sons, now used for the allowance assigned to the prince of a reigning house for a proper maintenance out of the public chest.

Apparent, in astronomy and general physics, a term applied in contra-distinction to *real*. The *apparent motions* of the stars are due to the real motions of the earth, diurnal and annual. The *apparent position* of a star differs from its real position in the heavens by reason of the aberration of light. *Apparent noon* is at the instant the sun is crossing the meridian. The meaning attached to *true noon* (q.v.) is a convention. The *apparent magnitude* of a heavenly body is the angle subtended by a diameter at the observer's eye, and depends on the distance of the body as well as on its real magnitude. The apparent magnitude of the moon is much greater than that of Jupiter, though the real magnitude is much less. Other such distinctions will be noted elsewhere.

Apparitions, a general term embracing all visible spiritual appearances — of supernatural beings (angels, demons, fairies), of doubles of the living (fetches, wraiths), or of the ghosts of the dead. This definition marks off apparitions—which are said to be objective—from hallucinations, which are admittedly subjective, and in many cases the result of physical disease. The belief in apparitions is widely spread, and references to it occur in the earliest literature of the human race. The literature of apparitions is a noteworthy instance of the survival of the belief of the lower races far into civilised times. For a ghost always appears dressed, sometimes—as in the case of Hamlet's father—armed. Every one who has read or heard a ghost-story knows how the garments of ghosts rustle; they used to drag clanking chains, but these went out with Mrs. Radcliffe and "Monk" Lewis. In *Blackwood's Magazine* for July, 1890, is a short story in which the ghost is a "tall lady dressed in black." Those who claim that apparitions are objective may be fairly asked on what other theory than that of survival can such an idea of a *revenant* be accounted for. The modern theory of apparitions is that they are purely subjective.

Appeal. In its most general sense an appeal is a proceeding taken to rectify or revise a supposed

erroneous decision of a Court by submitting the question to a higher Court, hence termed the Court of Appeal. The term, therefore, includes, in addition to proceedings specifically so-called, the "cases" stated for the opinion of the King's Bench Division, the Court for Crown Cases Reserved, etc., under various statutes and proceedings in error. [ERROR.]

In the Supreme Court of Judicature every appeal from a judgment or order of the High Court to the Court of Appeal is brought on by a single motion in the Court of Appeal asking that the judgment or order complained of may be reversed, discharged, or varied. In the Common Law Divisions an appeal lies from the Judge in Chambers to the Divisional Court, and thence to the Court of Appeal, while in the Chancery Division the Judge in Chambers may either direct the matter to be argued before him in Court (after which an appeal lies to the Court of Appeal), or he may give leave to appeal direct to the Court of Appeal.

Appeals to the House of Lords also lie from any order or judgment either of the Court of Appeal or of any of the Scottish or Irish Courts. They are brought by petition, which is lodged by the appellant at the Parliament Office, and presented to the House at its next meeting by the Lord Chancellor or Clerk of the Parliaments, after which an order requiring the respondent to lodge his printed case is issued and served on him. If he intends to contest the appeal he enters an appearance, and the appellant gives security for costs. Each party then lodges a printed case stating the facts and reasons in their favour, and an appendix is also prepared containing printed copies of the documents and other evidence used in the Court below. The Appellate Jurisdiction Act, 1876, provides that an appeal of this kind shall not be heard and determined unless there be present not less than three "Lords of Appeal," that is to say, three of the following persons:—The Lord Chancellor, the Lords of Appeal in Ordinary, and such Peers as have held "high judicial office," viz. the office of Lord Chancellor of Great Britain or Ireland, or of paid Judge of the Judicial Committee, or of Judge of the High Court of Justice, or of the Court of Appeal, or of the Superior Courts of Law and Equity in England as they existed before the constitution of the High Court of Justice, or of one of the Superior Courts of Law and Equity at Dublin, or of the Court of Session in Scotland. One year (instead of five years) is the time limited for an appeal.

As to the County Courts, which now transact so much of the civil business of the country, the Judge may, after he has given his decision, accede to an application for a new trial on such terms as he thinks reasonable. Also, if either party is dissatisfied with the Judge's decision in point of law or equity, or upon the admission or rejection of any evidence, he may appeal to the High Court in the manner prescribed by the rules. This appeal lies to a Divisional Court of the High Court of Justice.

In appeals to the Privy Council, which lie from an Indian or Colonial Court, and in ecclesiastical matters, also in matters of Admiralty and lunacy, leave to appeal has in most instances to be obtained either from the Court below or from the Judicial Committee, and security given for the costs.

The Criminal Appeal Act, 1907, which does not extend to Scotland or Ireland, established a Court of Criminal Appeal, consisting of the Lord Chief Justice and eight judges of the King's Bench Division. A person convicted on indictment may appeal to this Court on a question of law, or, by leave, on a question of fact, or against the sentence, unless it is one fixed by law. With the consent of the Attorney-General, an appeal may be made from the decision of this Court to the House of Lords.

Appendicitis, inflammation of the vermiform appendix (q.v.), and of the adjoining intestines of the lower bowels.

Appendicularia, a genus of free-swimming TUNICATA (or "Sea Squirts") (order COPELATÆ), in which the tail is retained through life.

Appendix vermiformis, a small blind passage which opens out of the human large intestine just below the ileo-cæcal valve; it is three or four inches long, and sometimes gives rise to trouble from the impaction in it of a foreign body.

Appenzell, a small canton of Switzerland, lying wholly within the confines of the larger canton of St. Gall. Its area of 152 square miles is divided into two districts, the inner and outer Rhoden; the former is agricultural and Catholic, the latter is Protestant, and manufactures linen and cotton goods. The chief towns are Appenzell, Trogen, Gais, and Herisau. Appenzell, the capital, is on the left bank of the river Sittem.

Apperley, CHARLES JAMES, born in 1777, after serving in the army, settled down as a fox-hunting farmer, subsequently migrating to France in reduced circumstances. Under the *nom de plume* of "Nimrod" he wrote for the *Sporting Magazine*, and was the author of several books. He died in 1843.

Appert, BENJAMIN NICHOLAS MARIE, born at Paris in 1797, the originator of a scheme of mutual instruction that brought about very remarkable results in the French Army and in the prisons of that country. He managed a reformatory in the department of Moselle from 1841 to 1844, and made in 1846 a tour of Belgium, Germany, Prussia, and Austria, with a view to establishing his system.

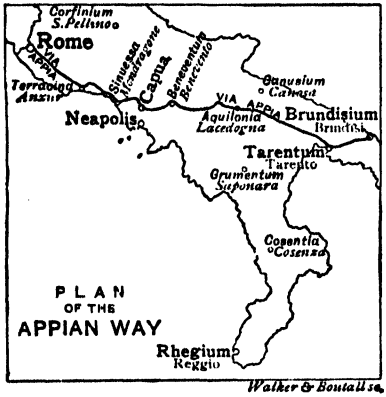
Appetite, generally the desire for food, although the term is applied in a wider sense to any desire of the body or the mind. The loss of appetite (in the more restricted meaning) is termed *anorexia* (q.v.), depraved appetite is called *pica* (q.v.), and insatiable appetite, *bulimia* (q.v.).

Appian, an Alexandrian Greek, who wrote in his own language a valuable history of Rome. It is comprised in 24 books, which follow no chronological order, but deal with the history of each nation conquered by Rome until its conquest, and of the Roman civil wars which preceded the downfall of the Republic; and sum up the statements of earlier authors whose works are lost. He was

contemporary with Trajan, Adrian, and Antoninus Pius, the latter of whom made him procurator of the empire.

Appiani, a modern Italian painter of merit, born near Milan in 1754. He showed early in life great talent for fresco painting, and was commissioned to adorn the cupola of Santa Maria di San Celso at Milan. This he did with such success as to earn the title of the Modern Raphael. He executed many works for public buildings, and attracted the attention of Napoleon, who conferred on him high distinctions. He died in 1818.

Appian Way (Lat. *Via Appia*), one of the oldest and most famous of Roman highways. It was laid down by Appius Claudius Cæcus in



PLAN OF THE APPIAN WAY.

312 B.C. as far as Capua; Julius Cæsar carried it farther, and Augustus completed it to Brundusium, the whole length being 350 miles. Horace made his well-known journey along it (*Sat.-pass*), and Statius describes it as *Regina Viarum*. The remains may still be traced, especially near Terracina, and part of it has been restored.

Appius Claudius, the name of a great patrician family of ancient Rome, almost always distinguished for hostility to the plebs. The chief members were as follows:—

1. APPIUS CLAUDIUS SABINUS REGILLENSIS, the founder of the family, a Sabine, who came to Rome about 490 B.C., and was admitted, with his followers, into the Claudia gens. He was consul in 482 B.C., and two of his sons attained the same honour.

2. APPIUS CLAUDIUS CRASSINUS, the Decemvir, and the would-be seducer of Virginia, held the consulship in 451 B.C.

3. APPIUS CLAUDIUS CÆCUS, the Censor in 312 B.C., constructed the great Aqueduct and the Appian Way. He defeated the Samnites in two campaigns. When old and blind he dissuaded the Senate from concluding a disgraceful peace with Pyrrhus.

Apple, the fruit of the *Pyrus Malus*, a small tree belonging to the tribe *Pomaceæ* of the order *Rosaceæ*. The apple-tree is wild in Europe and Western Asia, and has been cultivated from prehistoric times, about 2,000 varieties being now recognised. It can be grown up to 65° N. lat., farther north than any other fruit tree, but not within the tropics. Hereford and Devon are noted counties for apples, cider being there largely brewed from this fruit, while Kent is celebrated for table apples; but we also import enormous quantities of apples from the United States, New Brunswick, etc. The apple is distinguished from the allied pear not only by flavour but also by a total absence of gritty particles in its flesh, by the situation of the "core," or carpellary portion, near its base, and by the attachment of the stalk in a hollow or "umbilicus."

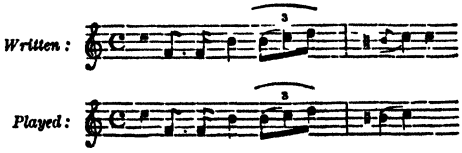
Apple of Sodom. [SOLANUM.]

Appleby, the capital of Westmoreland, stands on the left bank of the river Eden. The ancient castle defended by Lady Pembroke against the Parliamentary troops has now passed by inheritance to the Earls of Thanet. The church of St. Lawrence, founded in 1177, is an interesting structure. Pop. (1901), 1,764.

Appleton, a city of Wisconsin, U.S.A., situated on the Grand Chute Rapids of the Fox river.

Appleton, CHARLES EDWARD CUTTS BIRCH, born in 1841. He graduated at Oxford in 1863, and became fellow and lecturer at St. John's College. He wrote in favour of the "endowment of research." In 1869 he established the *Academy*, as a monthly periodical to be devoted to literature, art, and science under the highest aspects. He edited the paper till his death, which occurred in 1879. His *Life and Literary Relics* were published in 1881.

Appleton, D., born in 1785, the founder of the great American publishing firm of that name. He died in 1849, leaving the business to his three sons, the last of whom died in 1878. The greatest achievement of the firm was *The New American Cyclopædia*, issued in 16 vols.

Appogiatura, in *Music*, a term signifying the delaying a note of a melody by the introduction of a note before it. It is generally written in a smaller type than the notes of the melody, with or without a stroke across the stem. The following phrase from Beethoven's *Adelaide* furnishes an example:—

Appointment, the act of designating a person to an office or as a trustee, or to take an interest in property under a power of appointment. An

appointment to one or more of the objects of a particular power to the exclusion of the others is called an *Exclusive Appointment*. Every deed which creates a trust and nominates trustees should contain a power to appoint new ones, and this power should be comprehensive and provide for all usual contingencies. Such a power must be strictly exercised. In the absence of a power to appoint new trustees the Chancery Division of the High Court of Justice has jurisdiction to nominate them under divers statutes.

Appomattox, a river flowing east into the James river, Virginia, U.S.A., and giving its name to a county in the centre of the State. It has an area of 326 square miles. Appomattox Courthouse, a village in the county, witnessed the surrender (1865) of General Lee with the army of Northern Virginia to General Grant.

Apportionment, a division of a whole into parts (usually unequal) proportioned to the rights of more claimants than one. It is either (1) apportionment in respect of time, or (2) apportionment in respect of estate. When the interest of a tenant for life, or other person having a determinable estate, ceases, his successor cannot as the next accruer of income claim the whole as from the last payment, but an apportionment between the representatives of the deceased tenant for life and the person succeeding in remainder is directed. And now the Apportionment Act, 1870, provides that all rents, annuities, dividends, and other periodical payments in the nature of income shall, like interest on money lent, be considered as accruing from day to day, and shall be apportionable in respect of time accordingly. As to apportionment in respect of estate, it is provided that where the reversion upon a lease is severed and the rent is legally apportioned, the assignee of each part of the reversion shall in respect of the apportioned rent allotted to him be entitled to the benefit of all conditions of re-entry for one year's rent, and the Conveyancing Act, 1881, applies this principle to conditions generally.

Apposition, in *Grammar*, the placing together without a conjunction of two nouns which are in the same case. Thus, in the sentence, "John the man did this," the nouns "John" and "man" are in apposition with each other and the second explains the first.

Appraisement. A writ or commission of appraisement is one commanding the persons to whom it is directed to ascertain and return (that is, report) the value of certain property, as where goods are forfeited to the crown. Appraisers are persons employed to value goods, repairs, labour, etc.; they are required to take out an annual licence. According to an old statute, appraisers valuing goods too highly were compelled to take them at their own valuation. By the Law of Distress Amendment Act, 1888, goods need not in general now be appraised before sale, but are to be appraised only if the tenant or other owner of the goods in writing requires such appraisement to be made. [DISTRESS.]

Apprehension. [ARREST.]

Apprentice, a species of servant. An apprentice is bound by indenture usually for a term of years to serve his master, who on his part agrees to maintain and instruct him during such period. This binding is generally to persons of trade in order to learn their art and mystery. And by a provision which remained in force until modern times, it was in general required that every person who could exercise a trade in England must have previously served as apprentice to it for seven years. But later, all enactments, customs, and bye-laws which had the effect of prohibiting trades and occupations to persons who had not served therein as apprentices were abolished. It is, however, to be observed that in the City of London the customs and bye-laws on this subject remain as before. Apprentices are usually infants bound out by their friends, though their own consent (testified by their executing the indentures) is essential to the validity of the transaction. But there is a class called *Parish Apprentices*, who are bound under different conditions, for the children of parents unable to maintain them may be apprenticed till the age of twenty-one to such persons as shall be thought fitting to receive them by the guardians or overseers of the parish, and this without their own consent or becoming parties to the indentures; and the persons selected as their masters were formerly also compellable to take them. But the reception of a parish apprentice is no longer made compulsory. The Employers and Workmen Act, 1875, provides that any dispute between an apprentice to whom such statute applies and his master, arising out of or incidental to their relations as such, may be heard and determined by a Court of Summary Jurisdiction, and that such Court shall have the same powers as if the dispute was between an employer and a workman, and moreover may make an order directing the apprentice to perform his duties · on the other hand, the Court (if it thinks fit) may rescind the instrument of apprenticeship and require the whole or any part of the premium paid on the binding of the apprentice to be refunded; and if the apprentice shall disobey an order made that he is to perform his duties, the Court may cause him to be imprisoned for a period not exceeding fourteen days. In Scotland the system of apprenticeship has never had the same importance as it has had in England.

Approaches, *Military*, the works erected by an army for its protection while it is moving forward to attack any post. *Counter approaches* are the trenches made by the besieged against besiegers.

Approbate, or REPROBATE a term employed to designate a person who takes advantage of one part of a deed and rejects the rest. Scottish law—the maxim runs, "Qui approbat non reprobat." One who approbates cannot reprobate. A similar doctrine obtains in English law, and it is termed "election."

Appropriation, in the primary sense of the word, the making a thing the property of a person. Thus to appropriate a thing which is *publici juris*,

is to obtain a right to the exclusive enjoyment of it, so that the appropriator becomes the owner. Where a person is entitled to goods or moneys which form part of a larger quantity and are not distinguished, and afterwards the goods or moneys to which he is entitled are separated from the rest and set apart for him, they are said to be appropriated. Thus if A sell to B 1,000 bricks to be selected and taken away by B from a certain stack, then as soon as B has selected and taken away 1,000 bricks, they are appropriated to him, and the sale which was before executory is then complete. In ecclesiastical law appropriation is where a benefice is perpetually annexed to a spiritual corporation, either aggregate or sole, as the patron of the living. In such a case the cure of souls is generally given to a clerk who from being in effect the deputy of the appropriator or patron is called the vicar. In the British Legislature, the term applies to grants by Parliament which should only be expended for the objects specified. 2. The act of one who "appropriates" a payment—on account—to one of two debts, where the other would, if not paid, be barred by statute. The law does this in favour of the debtor where he has omitted to "appropriate."

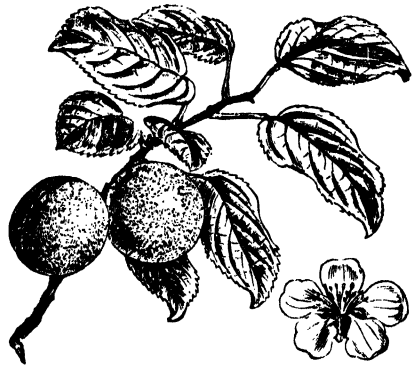
Approver, an accomplice in crime who accuses others of the same offence, and is admitted as a witness at the discretion of the Court to give evidence against his companions in guilt. He is vulgarly called "King's Evidence." His testimony must necessarily be of an unsatisfactory nature, and the practice is for judges to leave it to juries, with the direction not to believe it unless corroborated in some material particular by independent untainted testimony. If he fails to give full information, or equivocates, he may be proceeded against and punished on his own confession. The same practice prevails in Scotland, the term applicable to approver being "Socius criminis," but the practice so far differs from that in England that *absolute protection* is accorded to the "Socius" after proper warning that what he says cannot be used against him. Also a term applied to bailiffs of lords in their franchises, and sheriffs were called the King's Approvers in an act of Edward III.

Approximation, a mathematical calculation that is not absolutely correct, but sufficiently near for certain practical purposes. Thus the circumference of a circle of unit diameter is approximately $\frac{22}{7}$; the exact number cannot be expressed with a finite number of figures, and the importance of a useful approximation is obvious. Too high a degree of accuracy is needless in practical calculation, and involves waste of labour. Hence the practical utility of abridged methods of multiplication and division, of logarithmic and trigonometrical tables, which all involve approximations.

Apraxin, the name of a distinguished Russian family. 1. Theodore Matvayevitch, born in 1671, as a boy became a favourite of Peter the Great. As a naval officer he contributed appreciably to the glory of the Czar by organising the navy, defeating the Swedes, and taking the Åland Islands. He fell into temporary disgrace for peculation, but was soon restored to favour and office as high admiral, privy councillor, and senator. He died in 1728.

2. Stephan, Theodorovitch, Count, son of the preceding, born in 1702. As field-marshal he took chief command of the army intended to act against Frederic the Great. After capturing Memel, he defeated the Prussians at Gross-Jagendorf (1757), but, failing to profit by the victory, was charged with treason, recalled, and died during the investigation of the affair in 1758.

Apricot, the fruit of *Prunus Armeniaca*, a small tree belonging to the sub-order *Drupaceæ* of the order *Rosaceæ*, believed to be a native of Armenia, but common throughout the lower mountains of Asia, and cultivated in Europe and North America, though it seldom ripens well in England. It differs from the plum and the cherry in its downy skin or



APRICOT (*showing leaf, flower and fruit*).

epicarp, and from peaches and almonds in its smooth stone or *endocarp*. In a dried state apricots form an important article of food in the East. Britain imports large quantities in syrup from California. The liqueur *noyeau* is prepared from the kernels, *i.e.* the seeds.

April, the name of the fourth month of the year. There is a very wide-spread custom of playing little tricks or practical jokes upon people on the 1st of April; this generally takes the form of sending the "April fool" (as the victim is called) on a bootless errand. In Scotland the term used is "gowk," and he is usually made to carry a letter which bears the injunction, "Send the gowk another mile." The custom is said to be connected with the sending of Christ from Annas to Caiaphas, and from Pilate to Herod—the miracle-play (where this was represented) taking place in April; but the practice is found to exist among Hindoos, and is probably connected with the licence of the Spring Festival. The word *April* is held by some to be derived from the Latin *aperire*, to open, because the buds open in that month.

A priori (*from that which is before*), in *Logic*, a method of reasoning from a general principle to a particular cause or effect. Mathematical

proofs are *a priori*, and, the data being hypothetical, the reasoning is quite trustworthy. In other cases, however, *a priori* reasoning is very apt to be fallacious. "*A priori Knowledge*" is a term applied by Kant and others to knowledge alleged to be involved in the structure of the mind itself, and not derived from, but only suggested by, experience: *e.g.* the knowledge that $2 \times 2 = 4$, or that every charge has a cause. [A POSTERIORI.]

Apse, in *Architecture*, a semicircular recess forming the E. termination of the chancel of a church. In early churches it is frequently found at the

APSE. (INTERIOR OF DALMENY CHURCH.)
(*From a Photograph by A. A. Inglis, Edinburgh.*)

W. end. They have their origin in the Courts of Justice which formed part of the Roman Basilica; they are sometimes covered with semi-domed vaults or with ribbed vaults as in the church at Dalmeny.

Apsheron, a peninsula that runs into the Caspian Sea from the west, and terminates in Cape Apsheron, which is the extreme point of the Caucasian range. The whole peninsula abounds in mineral oils, naphtha, and inflammable gases. The soil yields also madder, saffron, and salt.

Apsides, the two extreme points in the orbit of a planet or satellite at the greatest and least distances from the centre of attraction.

Aptychus, the name of one of the plates of which a pair closed the mouth of the shells of AMMONITES.

Aptera, the wingless insects. There are four such orders, viz. ANOPLURA (Lice); MALLOPHAGA (Bird-lice); COLLEMBOLA (Spring-tails), and THYSANURA. They are not now regarded as closely allied. [APTERYGOGENEA.]

Apterygogenea, a division of insects, including those which never possessed wings, viz. the COLLEMBOLA (q.v.) and THYSANURA (q.v.). The other wingless insects have lost these appendages. The name implies the absence of wings both in the present forms and their ancestors.

Apteryx, a genus of Ratite birds, constituting a family (*Apterygidæ*), with four species (or perhaps two species, each consisting of two races), all from New Zealand. These birds, called by the Maoris "Kiwi," or "Kiwi-Kiwi," from their cry, have the merest rudiments of wings, and these are so hidden that they appear to be altogether wanting; the plumage is much more like hair than feathers, and there is no aftershaft. [FEATHER.] The North Island Kiwi (*A. mantelli*) and the large Grey Kiwi (*A. haasti*) are represented in the South Island by *A. australis* and the Little Grey Kiwi (*A. owenî*). As is evident from the popular names, the plumage of two of these species is grey; that of the North Island Kiwi is rufous brown, and that of *A. australis* sandy or greyish brown. The smaller species are about the size of a domestic fowl, but the Large Grey Kiwi is about two feet in height. The form of the body is not unlike that of the penguin, set on short stout legs, with three toes in front, and a short one behind raised above the level of the rest. The neck is short and thick, and the head is furnished with a long smooth, slender bill, having the nostrils at the tip. The bill is driven into the ground

APTERYX (*Apteryx australis*).

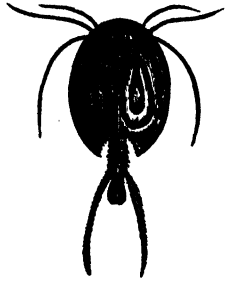
in search of worms, which constitute the principal food of these birds. Little is known of their habits in a state of nature beyond the fact that they live in pairs and pass the day in holes in the ground or at the foot of trees, coming out in the twilight to feed. They run with great rapidity, and if attacked endeavour to escape, but if hard pressed they raise the foot and strike downwards with considerable force, thus using the sharp and powerful claws as weapons of defence. Many living specimens have been brought to Europe, and they bear confinement fairly well. The North Island Kiwi in the Zoological Gardens, Regent's Park, laid two eggs, disproportionately large for the size of the bird, which were incubated for some time, but without result.

Apuleius, LUCIUS, born at Madauras in Africa in 125 A.D. or perhaps a little earlier. He studied at Athens, where he acquired a strong predilection for Platonism. Going to Rome he practised with success as an advocate. On his return to Africa he captivated and married a rich widow. This led to his being charged with sorcery, but his eloquent defence, preserved in the *Apologia*, secured an acquittal. His great work, the *Metamorphosis*, better known as the *Golden Ass*, contains the romance of Psyche besides other amusing stories that have been adopted by Cervantes, Le Sage, and Boccacio. Among his more serious productions are treatises on the life and doctrine of Plato, on the God of Socrates, and on the World. Though his style is inflated and full of barbarisms, he displays much versatility, humour, and intelligence.

Apulia (mod. *Puglia*), a name which is now somewhat vaguely applied to the country that extends along the east coast of Italy from above the promontory of Gargano to the river Bradano in the Gulf of Taranto, thus including the ancient Calabria. In classical times Apulia or Appulia (sometimes called Japygia) was a province bounded south by Calabria and east by Sammium and Lucania. It was divided by the river Anfidus into Daunia north and Peucetia south, the latter corresponding to the Puglia of modern times. The primitive inhabitants were regarded as Oscans, but the country was colonised by Greeks from Arcadia. The Apulians struggled against Rome till 317 B.C., and were of doubtful faith in the Punic and Social wars. They were so severely treated by the Romans that to this day the country has never recovered its ancient prosperity.

Apurimac, or TAMBO, a river of South America, which, rising near Caylloma in Peru and receiving several large affluents, after a course of 600 miles, joins the Ucayli, one of the head-streams of the Amazon, near the ninth parallel of south latitude. It is also known as the Catongo, and Ene.

Apus, one of the best known of the PHYLLOPODA (q.v.). It has a shield-like *carapace* or shell, and sixty pairs of feet, all but one of which are *foliaceous* and *respiratory*. The members of the genus are gregarious in pools and ditches.



APUS.

Aquafortis, commercial nitric acid. Usually both weak and impure.

Aqua-marine, a pale-blue variety of the emerald.

Aqua Regia, a mixture of nitric and hydrochloric acids, which obtained its title from the property it possesses of dissolving gold.

Aquarium, a tank or receptacle in which aquatic animals and plants are kept as nearly as possible under natural conditions, for scientific purposes. In 1790 Sir John Dalyell formed a collection of living marine animals which he kept in tanks and glass jars, changing the water once, and sometimes twice a day. But such tanks were not aquaria. The first to apprehend the true principle on which an aquarium should be maintained was Dr. Ward (the inventor of the Wardian case) who endeavoured to reproduce in his tanks the actual conditions of life in a pond. He introduced plants to absorb the carbon dioxide given off by the animals, and to aërate the water. Gosse followed, and his book on the subject, Kingsley's *Glaucus*, and the writings of the Rev. J. G. Wood did much to make aquaria popular. In 1852 the Zoological Society of London erected a house for marine aquaria—the first official recognition of their scientific value. They are distinguished as *marine*, *freshwater*, and *microscopic*, according to the forms of life kept in them. For the first two the tanks may be of almost any shape; the worst is the glass globe, in which one often sees unfortunate gold fish imprisoned, without a spray of weed to shelter them from the glare of the sun. The best is an oblong tank, of which the width should be greater than the depth, to expose as large a surface as possible to the action of the atmosphere. *Microscopic* aquaria for the cultivation of minute organisms may be maintained in any small glass vessel. Some observers use zoophyte-troughs; and infusoria are generally bred in test-tubes containing water in which hay, straw, etc., is infused. The beginner may easily gain from books sufficient information to start with; he will soon acquire experience and find friends ready and even eager to help him. It will, however, greatly enhance his pleasure if he has some definite object in view, say the working out of the life-history of some animal or plant, and in this way he may make some solid contribution to the sum of scientific knowledge. Aquaria are part of the equipment of every zoological station (q.v.); the name *aquarium* is often used to denote a place of entertainment in which the scientific meaning of the word is quite secondary or altogether lost sight of.

Aquarius (*water-bearer*), the eleventh sign of the zodiac (q.v.).

Aquarius, MATTHIAS, a monk of the Order of St. Dominic, who wrote on the Aristotelian and scholastic philosophy and was professor of theology at Turin, Milan, Venice, Naples, and Rome. He died at Naples in 1591.

Aquatint, a method of engraving by which a result similar to water-colour drawing is obtained.

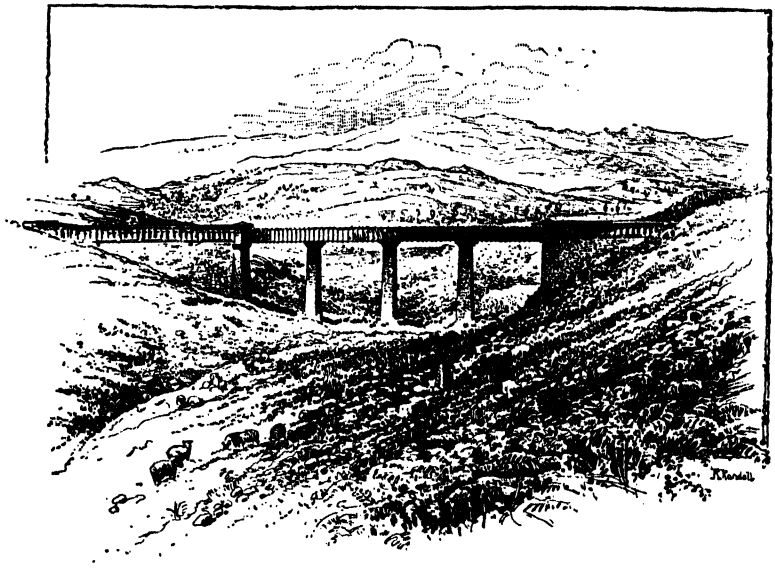
Aqua Tofana (so called from a woman named Tofana, who lived in the 17th century, and was said to have poisoned 600 people with this liquid), a preparation in which arsenic is the principal agent.

Aqua Vitæ (*water of life*), the name applied to spirits, more especially spirits of the first distillation. The same idea is seen in the terms *whiskey*, *usquebaugh*, and *eau de vie*.

Aquaviva, or ACQUAVIVA, CLAUDIUS, a member of a distinguished Neapolitan family, who

was born in 1542, and became in 1581 General of the Order of Jesuits. He drew up the *Ratio Studiorum* for their guidance, and he took an active interest in the Molinist controversy. His death took place in 1615.

Aqueduct, strictly speaking, any channel by which water is conveyed from one place to another; the term is usually limited however to signify those structures which convey water to large cities, generally from some distant place. Aqueducts were largely in use among the Romans, no fewer than 20, indeed, supplying Rome itself. The remains of the



LOCH KATRINE AQUEDUCT. (*From a Photograph by Messrs. Annan & Sons, Glasgow.*)

Roman aqueducts prove that in this particular form of work the Romans had no equal, and some of their magnificent structures are still in use to-day, while all over the Continent traces are to be found of such works. Amongst the more celebrated of the aqueducts of antiquity (apart from those which supplied Rome itself) are those at Nimes (the Pont du Gard, 180 ft. high), Segovia, Taragona, and Lyons. Of modern aqueducts the Croton aqueduct, which supplies New York with water, is about 40 miles long, while Glasgow is supplied from Loch Katrine by a channel 35 miles in length. In 1886 works were commenced for an aqueduct to bring water from Lake Thirlmere to Manchester, a distance of 100 miles, a scheme which was eventually completed. Liverpool is supplied from Lake Vyrnwy in Wales.

Aqueous Humour, the fluid between the cornea (q.v.) of the eye and the crystalline lens.

Aquila. 1. A Jew born at Pontus in Asia Minor, who with his wife Priscilla was driven out of Rome by the edict of Claudius, and then resided at Corinth. Being tent-makers like Paul, he and his wife entertained the apostle, and afterwards accompanied him to Ephesus (Acts xviii. 18), where they remained.

2. A Greek of Sinope alleged to be a relative of Hadrian, who employed him to build the city Ælia Capitolina on the site of Jerusalem. Here he became a convert to Christianity, but was expelled from the Church for practising astrology. He then turned Jew, and translated the Old Testament into Greek.

3. CASPAR, whose German name Adler (eagle) was Latinised for literary purposes, was born at Augsburg in 1488 and entered the Church. He threw himself with ardour into Luther's movement, became a great friend of the reformer, aiding him in the translation of the Bible. In 1550 he was appointed dean of Schmalkald, but ultimately returned to Saalfeld and died there in 1560.

Aquila, the capital of the province of Abruzzo Ulteriore II. (also called Aquila), 56 miles north-east of Rome, on the river Aterno, a well-built and prettily-situated town, founded by the Emperor Frederick II. on the ruins of Amiternum, the birthplace of Sallust. The chief articles of trade are paper, linen, wax, and saffron. The province has an area of 2,509 square miles

Aquileja, or AGLAR (Lat. *Aquileia*), an ancient town of Italy, situated at the head of the Adriatic about 22 miles west of Trieste. Colonised by Rome in 180 B.C., it rose to be one of the chief cities of

the Empire with 130,000 inhabitants. Several councils of the Church were held here, and its bishops claimed the title of patriarch. Aquileja is now a mere village.

Aquinas, or D'AQUINO, THOMAS, born about 1227 A.D., entered the Dominican Order at the age of twenty, and after studying at Cologne and Paris graduated as Doctor of Theology in 1257. He spent his life in the service of his Order, and refused ecclesiastical promotion though revered and consulted by the Pope and by his kinsman, Louis IX. He combined the highest intellectual culture of his times with such remarkable piety and sweetness of temper as to earn the title of "The Angelic Doctor." In 1323 he was canonised, and his authority has come to be recognised as paramount in the Roman Church, though his theological opponent, Duns Scotus, of the Franciscan Order, for many years had a large following. The views of Aquinas are summed up in his great work entitled *Summa Theologiæ*. Aquinas spent his last years at Naples, and died in 1274 at the monastery of Fossanova, near Terracina, on his way to the Council of Lyons.

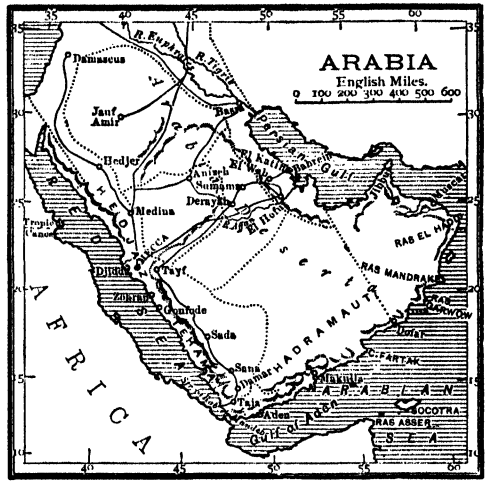
Aquitaine (Lat. *Aquitania*), the ancient name of that portion of Gaul that is comprised between the Pyrenees and the Garonne. After conquering the country, Cæsar extended the limits of Aquitania to the river Loire, and Augustus added to it the territories of the Bituriges Cubi (afterwards Berry and Bourbonnais). Clovis in the next century annexed it to the kingdom of the Franks. In 628 it was for a short time a kingdom in itself, but was reduced to a duchy till 768, when Charlemagne again erected it into a dependent sovereignty. In 877 Aquitaine once more became a duchy and the name was corrupted into Guyenne. In 1137 Eleonora, daughter of the last duke, married Louis VII. of France and brought Guyenne and Gascony as her dowry. On her marriage with Henry II. the duchy became an appanage of the English crown, and was retained until 1453.

Arabesque, in *Architecture*, a style of ornament in which men, animals, plants, or mathematical figures, are represented in fanciful arrangement. There are three varieties of Arabesque—the Roman, the Arabian, and the Christian.

Arabgir, or ARABKIR (anc. *Anabrace*), a town in the vilayet of Sivas, Turkey in Asia, 150 miles S.S.W. of Trebizond, and on the caravan route to Aleppo. Silk and cotton goods are manufactured there.

Arābi, AHMED, PASHA, the son of the Sheikh of a village in the Nile Delta, was born in 1839, and claims descent from the Prophet. He passed from the military school at Cairo into the Egyptian army, and after serving in Abyssinia and the Soudan had attained the rank of full colonel in 1879, when Tewfik became Khedive. In January, 1881, he headed a military demonstration in favour of military reform, and was arrested by Riaz Pasha, but forcibly released by the troops. His position grew daily stronger as head of the National party, and in September he took the lead in a second demonstration, demanding the removal of Riaz, the increase of the army, and the grant of a liberal constitution. The Khedive yielded. Arābi was named Under-Secretary for War (January, 1882), and soon after Minister of War, with the title of field-marshal, whilst the Sultan conferred on him the order of the Mejidieh. From the bombardment of Alexandria (July 11th) to the battle of Tel-el-Kebir (September 13) he directed as Commander-in-chief all the operations for the defence of Egypt; but, misconstruing the attitude of England and the Powers, or unwilling to impede the traffic of the world, he left the Suez Canal open. Sir Garnet Wolseley promptly took advantage of this omission, and in a few days the revolutionary movement was crushed. Arābi surrendered immediately after the action of September 13, and was brought to trial. Before the completion of the case he agreed to plead guilty, and to accept perpetual exile in Ceylon, whither he was conveyed with five of his chief accomplices. He was allowed, however, to return in 1901.

Arabia (*Jezirat-al-Arab* of the inhabitants, *Arabistan* of the Turks and Persians), the south-west peninsula of Asia, shaped like an irregular



MAP OF ARABIA.

parallelogram (almost a triangle), extending between long. 32° 30′ to 60° E., and lat. 12° 41′ to 34° N. The Red Sea, the Indian Ocean, and the Persian Gulf bound it wholly or partially on three sides. The Gulf of Suez separates it from Africa; but there are no recognised lines between it and Asiatic Turkey. Altogether, it is about 1,800 miles in length, and about 600 in breadth, with an area of 1,219,000 square miles, and a population estimated at not much above 5,000,000, though no census has been taken, and much of the Dahna or desert has never been explored. The old divisions of "Arabia Petræa," the region around Petra, in the N.W., "A. Felix," along the W. and S.W. coasts, and "A. Deserta," in the

interior, are unknown to the inhabitants, who speak of the different areas under the following names:— (1) Sinai, the peninsula between the Gulfs of Suez and Akaba, a mass of naked rocks and craggy precipices, cut into by long narrow defiles and sandy valleys, in which dwarf acacias, tamarisks, euphorbias, and thorny shrubs are the only vegetation, if a few date palms, and a little grass in favoured places are excepted. (2) The Hedjaz, and (3) Yemen along the shores of the Red Sea, and for some indefinite distance into the interior, divided into the Tehama or low country (in which are the ports of Djidda, Yembo, Mokha, and Loheiha), and the smaller plateau of Shomer is also intersected by mountains, and in this region, the coast towns, the holy cities (Mecca and Medina, which subsist by the pilgrims), and the oasis of Jauf (60 miles by 10 broad), are found the greater number of the settled inhabitants of Arabia. The mean height of the highlands is 3,000 to 4,000 ft.; but several peaks rise to close on 7,000 ft., their seaward sides being steeper than their inland slopes. Points of the interior table land, which falls to the E. and N., are said to attain an elevation of even 8,000 ft., but vast tracts are still unknown. In brief, Arabia as a whole is not a fertile or a wooded land, much of it

GROUP OF ARABS.

more mountainous district on the landward side. The Hedjaz is for the most part barren country, being stony in the north, and sandy to the east and south, with a few brackish wells, and some streams which dry up in summer. The roads are merely camel tracks made by the pilgrims to Mecca, the holy city surrounded by the Haram or sacred territory, and Medina, in the vicinity of which and at Kholeys, N. of Mecca (of which Djidda is the port), there is some cultivation possible owing to the presence of springs; drought causes sterility elsewhere. Yemen is better watered, and has in consequence several rich valleys. (4) Hadramaut, along the southern coast, sterile, sandy, and stony. (5) Oman, the S.E. end of the peninsula, in which is the harbour of Muscat, mountainous, hot, but in parts very fertile, and with manufactures of silk, cotton and arms. (6) El Hasa, along the Persian Gulf, flattish and fertile; and (7) Nejd, the central plateau, the highest point of which is Djebel Toweyk, with many settled valleys, through which streams flow in the rainy season. The being rolling sands, or barren mountain slopes (on the sides which face the sea), with valleys better watered and plateaux which afford fair pasturage for the wandering Arabs. Roughly, according to Palgrave, a third of the country is coast ring and mountains, partly barren, partly either cultivated or susceptible of tillage, a third of central plateau tolerably fertile, and a third desert circle, intervening with only one gap between the first and second.

The *climate*, as a rule, is warm, but dry and healthy, though the hot winds called "Khamsin" in the northern desert, and "Simoon" in the eastern districts are very trying even to the natives. The middle part of the country being included in the rainless regions of the Old World, and in the belt of greatest heat, is extremely torrid during the dry months. But it is not actually without rain, some falling in S. Arabia during the cold season in Yemen from June till September, and sometimes during winter. In Oman, showers may be expected three or four times a month, from October till May, but at Aden "the rains" last only from November

till February or March. The south coast is best supplied; the interior deserts are often unmoistened for many months or even years at a stretch, and then by torrents which are over in a few hours. But radiation and evaporation being rapid, considerable cold is experienced at night, and the hills are not unfrequently white with snow, while on the interior table lands the winters are comparatively rigorous. Yet the shores of the Red Sea are at times so hot that Europeans sicken, and children die, while at Muscat (in Oman), when the temperature is 100° in the shade, the Arabs sleep naked on the flat roofs of their houses and are watered like plants, a habit which may account for the prevalence of muscular rheumatism. The chief danger to health is from the sudden alternation from extreme heat to cold consequent on the change of wind.

The *products* of Arabia are cereals—wheat or barley in small quantities, millet, rice, and pulse; beans, melons, gourds, cucumbers, cabbages, cumin and the like, two crops a year being common in certain places; coffee, cotton, sugar, tobacco, indigo, gum Arabic, balm, various drugs and resins, tamarinds, lavender, frankincense, myrrh, etc., and above all dates, on which the Arabs mainly depend for food. Horses, camels, oxen, sheep, goats, and asses are the domestic animals; the Arab horses, the Oman camels, and the Mahrah dromedaries, still maintaining their ancient reputation. The wild ass roams the plains, and though the lion seems now extinct, the panther, hyæna, ounce, wolf, fox, wild boar, apes, antelopes, ibex, and other large quadrupeds are common. The ostrich is chased for its feathers; peacocks and parrots are found in Nejd, Hasa, Oman, and the southern provinces, and many of the Arabs train hawks for the purpose of falconry. With the exception of lizards, reptiles are comparatively rare, and only two vipers are deadly; but scorpions are plentiful, centipedes annoyingly frequent, white ants as troublesome as in southern India, and vast swarms of locusts destructive to the crops, though they are freely eaten by the Arabs. Minerals of any value are scarce. Some precious stones are met with; lead and silver are mined in the Oman mountains; cinnabar and sulphur occur, rock salt is common, petroleum may not unlikely be found in quantity, but no gold is at present unearthed in Arabia. The pearl fisheries of the Persian Gulf are a source of considerable profit. Agriculture is, however, at a low stage, and with the exception of leather dressing, the weaving of coarse fabrics, iron work of a rude description, gold and silver work of a finer quality, and (in Oman) woollen weaving, silk and gold embroidery, filigree, sword cutlery, etc., there are few manufactures of importance. Trade, in like manner, is rudimentary. Camels and sheep, hair and wool, coffee, dates, horses, rice, and pearls sum up the exports, their relative importance being indicated by the order in which they are named. White cotton cloth, Indian prints, sugar, hardware, arms, ammunition, and a few trinkets are the principal imports.

The population is made up of Arabs, and on the coast a number of Jews and Turks. But the interior tribes are quite unmixed with alien stocks, and still keep up the patriarchal form of government, each tribe being ruled by a Sheik or Shereef (descendant of the Prophet), or an Elder. With the exception of the Joctanides (the ancient Himyarites), who speak a dialect of their own, and hold the south coast, Arabic is the universal language of the people.

Politically, Hedjaz, El Hasa, and Yemen are vilayets of Turkey. Egypt claims the Sinai Peninsula, and the old Land of Median, stretching southward from the Gulf of Akaba. The Sultan of Oman is independent, though in alliance with and under English control. Nejd, the seat of the once important Wahabee empire (q.v.), is also left to itself. The Emir of Shomer (capital, Haïl) pays tribute to the Shereef of Mecca, who is appointed by the Sultan of Turkey; and England, besides occupying Aden and the island of Perim at the mouth of the Red Sea, owns the Kuria Muria islands on the south coast, and exercises great influence in Hadramaut (split into numerous little states or principalities), and a protectorate over the coast tribes from Perim to Ras Sais. But the interior nomads are practically their own masters, and except in the Turkish provinces the reins of government are held very loosely. Until the rise of Islam Arabia had little history, but under Mohammed and his successors the country was welded into one sovereignty, and the people, inspired by the fanaticism of a common creed, issued forth as conquerors and colonists, whose empire became one of the greatest in the world's history. [MOORS, CALIPHS, ETC.] In the sixteenth century the Turks subdued Yemen, but were expelled in the seventeenth century. During these two centuries Oman was under the Portuguese, who held Muscat and other places on the coast from 1508 to 1659. The Dutch and the Persians also essayed a footing, and in 1760, Mohamed-ibn-Abd-el-Wahab of Nejd founded the Wahabee empire, which lasted until, in 1812–18, it was shattered by Mohammed Ali, Viceroy of Egypt, though it soon again recovered itself, Oman, however, remaining independent. But since that date this monarchy has so fallen in pieces that with the exception of Nejd (capital, Riad; pop., about 500,000) no portion of Arabia is included in the Wahabee dominions. All the rest of its provinces have quietly reasserted their independence, or gravitated under the Turkish sway, Yemen and the Hedjaz having been restored by Egypt in 1841, after Mohammed Ali's discomfiture.

Ethnologically the *inhabitants* of Arabia belong exclusively to the Semitic family, of which they form by far the largest and most important division. In fact, with the exception of the Jews and Abyssinians, all other divisions (Syrians, Phœnicians, Chaldæans, Assyrians, Samaritans, Himyarites) have been altogether assimilated in speech, and mostly in religion, to the Arabs, the language and precepts of the Koran being now dominant throughout the whole of the Arabian peninsula, Syria, and Mesopotamia—that is, the primeval home and historic domain of the Semitic peoples. Physically also a great fusion of allied races has taken place, resulting in a distinct sub-Semitic Arab type, which prevails with considerable uniformity throughout the Arab-speaking lands, and which is characterised by a long

oval face, aquiline nose, receding chin, moderately high forehead, small mouth and ears, dolichocephalic head, black eyes and hair, fair complexion but easily bronzed in the sun, middle height, averaging 5·50 feet. With the spread of Islam the Arabs have passed in large numbers into north Africa. Here the race has become perfectly acclimatised as far as the Chad basin, and has mainly preserved its type, language, and religion intact. In Asia Arab settlements have been founded as far east as Turkestan and parts of India and the Eastern Archipelago; but here they have generally become absorbed in the surrounding populations, many of whom claim Arab descent, though preserving of the race nothing but the Mohammedan religion. Even in Arabia itself especially, the continuous inflow of African slaves has made itself felt in the decidedly dark colour and heavy features of many communities, especially in Yemen, Oman, and Hedjaz. The people of Arabia are generally supposed to be all Bedouins —that is, nomad pastors, living under tents and wandering with their flocks and herds from oasis to oasis. But this description is applicable chiefly to the tribes of the steppes on the Nejd plateau. Elsewhere, and especially in Yemen, they form agricultural and even urban communities engaged in trade and numerous industries, these various pursuits depending not on race, but on the conditions of the environment. The Arabic language is by far the richest in grammatical forms, in wealth of words and expressions, and in literary monuments of all the Semitic tongues. Its position in this family seems to lie somewhere between the old Assyrian and Hebrew. Compared with the Aryan languages it has undergone but slight change since the seventh century, when it was first reduced to written form.

Arabian Nights, or THE THOUSAND AND ONE NIGHTS, a very celebrated collection of tales of great antiquity, although as we know them at present they probably do not date back farther than the middle of the fifteenth century. The collection was first introduced into Europe by Galland, who made a translation into French, published in 1704. There is one connecting story in the *Arabian Nights* which forms the thread which binds the whole together. A Persian monarch had made a vow that he would marry a fresh bride each day and execute her the following morning. The daughter of his grand vizier obtained permission to become the king's wife and succeeded in abolishing the custom in the following manner: at daybreak she commenced telling to her sister, who slept in her room, a story, and broke off at a very interesting point. The king deferred her execution for a day in order that he might hear the conclusion of the tale, and this occurred from day to day for one thousand nights, when the king allowed her to live.

Arabic, GUM, obtained from several species of *Acacia*, especially *Acacia arabica*. The best comes from Arabia; but inferior varieties are obtained from Senegal. Gum Arabic consists essentially of a combination of Arabic acid with lime, magnesia, and potash.

Arable Land, land which is cultivated by the plough. The term is applied to such land, as opposed to pasture land, meadow-land, moorland, common-land, wood or moor.

Aracari, the native names of toucans of the genus Pteroglossus, ranging from Nicaragua to South Brazil, differing from the true toucans in being of smaller size, and of more brilliant and variegated plumage. [TOUCAN].

Arachnida, a class of ARTHROPODA, the members of which breathe by TRACHEÆ, a series of air-tubes running through the body; they have eight legs, no jointed limbs on the abdomen, nor antennæ; the head and thorax may be united. Many authors include the TRILOBITES, LIMULUS (KING-CRAB), etc. (for which see ARTHROGASTRA). The class is sometimes united with the Crustacea as the Acerata. As here defined, the class includes seven orders, viz. LINGUATULIDA (worm-like parasites), ACARINA (ticks), TARDIGRADA (water-bears), ARANEIDA (spiders), PHALANGIDÆ (harvest-men), PEDIPALPI, SCORPIONIDÆ, PSEUDOSCORPIONIDÆ and SOLIFUGES. Representatives of the class occur first in the Silurian period.

Arad, (1) a county and chief town in Hungary The latter is situated on the right bank of the river Maros, 145 miles from Pesth and 60 miles from Szegedin. It is the see of a Greek bishop, and possesses a citadel, which was in 1849 captured by the revolutionary party, and made their headquarters. There is a large trade in corn, and a cattle-market that stands third in Hungary. The chief manufacture is tobacco. This town is called Old Arad in contradistinction to New Arad, founded in 1763 on the other side of the river. The county has an area of 2,490 square miles. It is famous for its wine. (2) The name of one of the 31 royal cities conquered by Joshua (Josh. xii. 14), now known as Tell' Arad.

Arago, FRANÇOIS JEAN DOMINIQUE, an illustrious French physicist, born in 1786. Entering the École Polytechnique at the age of 17, he was three years later appointed assistant to Biot for the purpose of verifying the measurement of the earth. In 1809 he received a professorship in his former school, became director of the Observatory, and in 1830 was elected perpetual secretary of the Academy of Sciences. From 1831 to 1848 he took an active interest in politics as a moderate but earnest Republican, and in the latter year was appointed a member of the Provisional Government, and marched with the troops against the barricades, after which he retired in disgust from public affairs. Arago's contributions to science were varied and brilliant. He finally established the undulatory theory of light; extended our knowledge of the phenomena of polarisation; advanced considerably the researches of Oersted and Ampère into the relations between magnetism and electricity; discovered rotary magnetism, for which he was awarded the Copley medal of the British Royal Society, and introduced many improvements in the construction of astronomical instruments. His skill in popularising scientific ideas was almost unrivalled. Strangely enough, he left behind him no great literary record of his achievements, though he

contributed freely to the learned periodicals of his day, and founded, with Gay-Lussac, the *Annales de Physique et de Chimie*. Arago refused to recognise the government established by the *Coup d'État* of 1852, and Louis Napoleon honourably respected his consistency. Broken in health, he went to his native Pyrenees in the vain hope of recovery, but returning to Paris, died in 1853 and received a public funeral.

Aragon, sometimes called Arragonia, now a captaincy-general of Spain, is bounded on the north by the Pyrenees, west by Navarre and Castile, south by Valencia, and east by Catalonia. It contains three provinces, viz. Huesca, Teruel, and Saragossa, and its chief town is Saragossa. The river Ebro, flowing south-east, cuts it into two nearly equal parts. The upper half includes some of the highest summits of the Pyrenees, and mountains covered with forests skirt and indent the country on almost every side. In the centre there are stony and sandy plains, though water is abundantly supplied by the Ebro, the Guadalaviar, the Tagus, the Xucar, the Gallego, and the Aragon. It has an area of 17,976 square miles. The products are fruit, grain, saffron, hemp, flax, and sheep are reared in large numbers. The mineral wealth is great, but not exploited. Little is manufactured except coarse woollens, cordage, leather, wine, oil, and soda. Aragon was a part of the Roman Hispania Tarraconensis, and was wrested from Carthage about 200 B.C. The Goths succeeded the Romans in 470 A.D., and were expelled by the Moors in 714. The kings of Navarre, recovering the territory, made it into a dependent country, and so it remained till 1035. For the next four centuries Aragon was a separate kingdom, but in 1479 Ferdinand came to the throne, and having married Isabella of Castile united the two realms.

Aragonite, carbonate of lime ($CaCO_3$) crystallising in the prismatic system, and rather harder and heavier than the more common form calcite. Aragonite often occurs in twin-crystals forming short hexagonal prisms with grooved sides or six-rayed stars, or in a coral-like stalactitic form known as *flos ferri* from being associated with iron ores. Like calcite, it effervesces freely with acid; but it is deposited from hot solutions.

Araguaya, or GRANDE, a river of Brazil, which takes its rise in the Sierra Seidda, and flows into the Tocantins river near the 5th parallel of south latitude. During its course of a thousand miles it receives the waters of the Claro Diamantino, Vermelho, Goyaz, and Aixas on the right, and of the Rio das Mortes, Fasto, and Aquiqui on the left.

Aral Sea, or LAKE, THE, lies 150 miles east of the Caspian Sea in Western Asia, being separated from the latter by the plateau of Ust-Ust. Its length from north to south is 265 miles, and its greatest breadth 145 miles. The Syr-Daria (Jaxartes) and the Amu-Daria (Oxus) flow into it, but there is no visible outlet, and it is supposed that evaporation keeps the water, which is brackish, at its mean level, or even slightly diminishes its volume. The depth is 37 fathoms to the west, but only 15 fathoms in the centre. Winds from the N.E. make navigation dangerous, and in winter the northern portion is ice-bound. There are many islands on its surface, and at one of the largest of them to the south the Russians keep a small flotilla. It is known to Persian geographers as the Sea of Khuwenizm, and tradition asserts that it has twice been dry land owing to the diversion of the Jaxartes and Oxus to the Caspian Sea, which is 117 ft. lower in level.

Aralia, a genus of plants containing the ivy (q.v.).

Aram, EUGENE, an English criminal of the eighteenth century, to whose career Thomas Hood's ballad and Bulwer Lytton's novel have lent more romantic interest than the facts would warrant. Aram was born in 1704. He educated himself to such a point as to be able to act as an usher in various schools. While acting in this capacity at King's Lynn he was arrested, in 1753, for the murder at Knaresborough, fourteen years previously, of one Clark. Aram was convicted in spite of his clever defence. He was executed at York, 1759.

Aramaic Language, the language spoken in Palestine by the Jews in the time of Christ. It was closely allied to Hebrew and Phœnician. [CHALDEE.]

Aran, THE VALLEY OF, one of the highest of the Pyrenean valleys, lies within the province of Lerida, Spain. The Noguere and the Garonne have their sources here.

Aran Islands, THE, three in number, form a natural breakwater across Galway Bay on the west coast of Ireland. The largest, Aranmore or Inishmore, is 8 miles long by 3 miles broad. The other two are named Inishman and Inisheer. The total area of the group is 11,287 acres. They contain many interesting relics of antiquity, towers, altars, and holy wells, to which pilgrimages are made.

Aranda, DON PEDRO PABLO ABARCA DE BOLEA, Count of, born in 1719. He was at first a soldier, but taking later in life to politics held the presidency of the Council of Castile (1766). He banished the Jesuits, put down brigandage, and curtailed the powers of the Inquisition. From 1773 to 1787 he served as Ambassador to France. From 1792 he became the Prime Minister of Charles IV., but was supplanted by Godoy, and died in 1798.

Araneidæ. [SPIDERS.]

Aranjuez, a town in the province of Toledo, Spain, on the Tagus, about 28 miles from Madrid, with which it is now connected by railway. After 1552 it was for a long while the residence of the Spanish Court in the early summer. In 1772 a treaty was made at Aranjuez between Spain and France against England, and in 1808 the insurrection broke out at this spot that led to the French invasion of Spain and the Peninsular war. A severe visitation of cholera occurred in 1884. The local breed of horses and mules is highly esteemed.

Arany, JANOS, a Hungarian poet, was the son of a peasant. Born in 1819, he was destined for the Church, but was appointed in 1840 notary at Szalonta. A satire on the *Lost Constitution* in

1843, and a trilogy on a purely Hungarian subject —*Toldi*—in 1847, brought him suddenly into popular favour. His later works hardly maintained his reputation. He received a professorship of literature at Nagy Köros, edited a paper at Pesth, and was elected to the Academy of Hungary. He died in 1882.

Arapahoes, a North American tribe, identified by some with the *Gros Ventres* of the early French writers; they are a chief member of the western division of the Algonquin family, although classed by some ethnologists with the Dakotas. Their original domain lay towards the western verge of the prairies between the South Platte and Arkansas rivers, within the limits of Colorado; but in this State their memory survives only in "Arapata" county named from them. A few have moved north and still lead a nomad life in the territory of Montana; but most of them have been removed with their Cheyenne allies to a reserve in the northern part of Indian territory north of the Canadian river. In 1820 they were estimated at 10,000; but since then they have been reduced to less than half that number. Physically they are a fine race, typical "Prairie Indians," tall, of coppery complexion, high cheek bones, massive jaws, large nose, and very long, straight black hair. Their language is a very marked variety of the Algonquin, from which it diverges greatly, the differences being apparently due to Dakota influences. The national name, which means "tattooed," is variously written, Arapaho, Arrapaho, Rapaho, etc. The best accounts of this nation are given by W. Blackmore in *The North American Indians*, and by Fisher in *The Arapahoes, Kiowas,* and *Comanches.*

Arapunga, the native South American name of a species of Bell Bird (q.v.).

Ararat, a mountain in Western Asia (lat. 39° 42′ N., long. 44° 35′ E.), which tradition identifies as the spot where the Ark stopped (Gen. viii. 4). Situated on the confines of Russian Armenia, Turkey, and Persia, it is known to the Armenians as *Masis Lensar* or Mountain of the Ark; to the Persians as Kuh-i-Nuh, or Noah's Mountain; and to the Turks as Akh-dagh or Steep Mountain. It is of volcanic origin and rises in two cones. Akh-Dagh (Greater Ararat), the higher of the two, has an elevation of 17,112 feet, surpassing all other peaks of Western Asia. The other, Allah Dahr (Lesser Ararat), is 13,085 feet high. In 1840 a terrible earthquake altered the shape of the mountain, destroying also the village of Argusi at its foot and the monastery of St. James on its flank. It was a local superstition that no living creature could scale the snow-clad summit, but Dr. Parrot performed the feat in 1829, and since then several mountaineers have made the ascent, amongst them Professor Bryce, who described his journey in a book published in 1877.

Aras (classic *Araxes*), a river of Armenia, which takes its rise in Mount Tekdagh, some twenty miles south of Erzeroum, and flowing north-east for 700 miles through Erivan and Chirvan, joins the Kur, and empties itself into the Caspian Sea.

Aratus, (1) of Sicyon in Greece, who united his native city with the Achæan League, a federation of those of the Greek States of the Peloponnesus. He was elected General or President of the League in 245 B.C. (2) a Greek poet, who was born in Cilicia about 300 B.C., and flourished at the court of Antigonus Gonatas, King of Macedon. He wrote two didactic poems on astronomy, entitled *Diosemeia* and *Phainomena,* which Cicero translated and from which Virgil largely borrowed. He is quoted by St. Paul in his address on Mars' Hill (Acts xvii. 28).

Araucania, a republican confederation in South America, lying south of Chili, and bounded by the rivers Biobio and Valdivia. The territory is about 180 miles long by 150 broad, with an area of some 25,000 square miles. In 1773 their independence was recognised, and their four states, governed by hereditary chiefs, form a feudal union free from European influence, though nominally protected by Chili. The breeding of cattle and vicunas is the chief industry. The port of Arauco is situated in a bay of the same name to the north, and half way down the coast is the important commercial city of Valdivia.

The Araucanians were renowned for their valour and highly-organised political system, which enabled them successfully to resist all attempts of the Spaniards to subdue them. But in the northern provinces many have been merged with the whites in a common Chilian nationality, constituting the most orderly and flourishing of all the Hispano-American commonwealths. The pure Araucanian race, whose territory extends from the Bio-bio southwards to the Valdivia (Callecalle), with a total area of about 25,000 square miles, still number from 70,000 to 80,000, of whom as many as 16,000 are reckoned as capable of bearing arms. The collective national name is *Moluché, i.e.* "warriors," and they form three separate geographical groups, known as *Picunché, Puelché,* and *Huilliché, i.e.* "People of the North," "East," and "South" respectively. They are a stout, vigorous race, of short stature (5·1 ft. to 5·2 ft.), with full round features, prominent cheek bones, large nose, broad at base, straight black eyes, long black hair, coppery or olive-brown complexion. The language is soft and euphonious, abounding in vowels and open syllables, but extremely difficult owing to its highly polysynthetic character. In this respect it is a typical American language, rivalling the Aztec, Miztec, or Kree in the extraordinary length of its words. The Araucanians, whose numerous tribes are governed by hereditary chiefs or nobles, are the Manichæans of the New World, their religious system being based on the theory of a good and evil principle (*Apo* and *Pillan*) contending for supremacy over men and the universe. Apo, being capable of naught but good, receives no worship, but Pillan, source of all evil, is propitiated by all sorts of offerings and sacrifices, formerly including human victims. Polygamy is universal; but the first wife is the most respected, though the women generally are treated as little better than slaves and drudges.

Araucaria, a genus of cone-bearing trees, now mainly confined to the southern hemisphere, but

abundant in a fossil state in the secondary rocks of Europe. They are evergreens with whorled branches and flat, stiff, pointed leaves arranged in a close spiral. They bear cones, the scales of which each bear a single edible seed and are deciduous. The

ARAUCARIA (CONE).

chief species are *A. imbricata*, the Monkey-puzzle or Chilian pine, *A. Brasiliensis*, *A. Bidwillii*, the Moreton Bay or Bunya-bunya pine, and *A. excelsa*, the Norfolk Island pine.

Arbela (mod. *Erbil*), a small town in Asiatic Turkey (formerly Assyria) about 40 miles east of Mosul (the ancient Nineveh). The battle in which Alexander the Great finally overthrew Darius (331 B.C.) takes its name from this place, but was in fact fought on the plain of Gaugamela, fifty miles to the westward.

Arbitration, the decision of a case or matter in dispute by a person not a judge in a court of law, but a private individual chosen by the parties. Very frequently more than one *arbitrator* is chosen, and should they disagree as to their decision (which is called their "award") a third person known as the *umpire* is called in. The awards of arbitrators or umpires are held to be binding and cannot be dissolved or transgressed except by consent of the court or of a judge. This method of settling disputes is frequently employed by persons who wish to avoid the delay and expense of legal proceedings; and questions of law, breaches of contract, disputes between workmen and employers, are all very often referred to arbitration. All felonies and offences which are of a public nature, however, cannot be referred to arbitration, it being deemed advisable that they should be punished and tried in a public court. There has lately been manifested a tendency towards International Arbitration, *i.e.* settling disputes between nations by means of arbitration instead of by war. Some of the most notable instances of this were the *Alabama* dispute between England and the United States, and the Venezuelan boundary question (1899).

Arboretum, a place planted with trees which are cultivated for scientific purposes.

Arboriculture, though etymologically including everything relating to the culture of trees, may, as opposed to sylviculture, be limited to the management of trees artificially planted in nurseries and plantations, and, as opposed to certain branches of horticulture and landscape gardening, be further restricted to the cultivation of timber and other trees for purposes of profit. In the selection of a site for a plantation and of the trees suitable for the same, consideration must be paid to the effects of climate and soil, the physiological requirements and peculiarities of the various species, and the market for the produce. An insular climate, moist and free from frost, is suitable for many broad-leaved evergreens; a continental one with hot summers and cold winters produces well-matured timber from broad-leaved deciduous trees; and conifers (needle-leaved trees, mostly evergreen) as a class will grow well and to full size, speaking generally, in higher latitudes than other trees. Though trees will not grow in a rainless tract, their presence will render any rainfall more uniform and apparently slightly increase the amount. Birch, Scots, Austrian and cluster pine will flourish in very dry, sandy soil, and other species, such as the beech and holly, prefer a warm soil, *i.e.* one with thorough drainage; but oak, elm, larch, and spruce do better in colder, less permeable soils, such as loams or clays, so long as they do not actually retain stagnant water. The deciduous cypress (*Taxodium distichum*) and many poplars, willows, and alders will flourish in actually swampy ground. It may be remembered that the fine timber of the Baltic provinces, though matured by extreme winter cold, grows for months at a time in some depth of standing water. A rich soil, like a moist climate, though conducive to rapidity of growth, produces spongy, less durable timber. The Oregon pine grows more rapidly in Scotland than in the Rocky Mountains; but the wood formed is not as valuable. Of European timbers the strongest and most durable is oak; but the conifers being far more rapid in growth yield a quicker return to capital invested in planting. In poor soil the Scots fir is, therefore, much grown in Britain; but in slightly better soil the more durable and yet quicker growing larch is preferred. Possibly the Oregon pine may prove a formidable rival to both. Nothing was done in England in the way of tree-planting before the 16th century, and although Evelyn's *Sylva* had an undoubtedly beneficial effect in kindling a taste for arboriculture, it was not until the 18th century, when large plantations were made, that any serious attention was given to the subject.

To secure even results it is better to form a plantation by planting trees than by sowing. This involves the maintenance of nurseries. Nurseries should be on high ground, but little exposed to frost, with a friable soil, free from stones, well-drained and containing vegetable matter, but unmanured. Both climate and soil, though such as to secure germination of seeds, should, to furnish hardy trees, be inferior to those of the plantation. Timber trees are mostly raised from seed, and this should be collected when well ripened. Fleshy fruits, such as holly and hawthorn, may be kept till the second spring, and those of most other trees until the spring immediately following their ripening. Poplar and willow are commonly raised from cuttings; but if grown from seed it should be sown directly it is ripe. In the spring of their

second year it is usual to cut off the tap-roots of most young trees with a spade so as to force them to send out lateral roots and to facilitate transplantation. Nursery plants should be transplanted every two years. Conifers may be planted out before they are four years old; broad-leaved trees at four, six, eight or ten years of age. On steep or stony hillsides sowing may be the only method of planting possible; but elsewhere the ground should be prepared beforehand, drained if necessary and freed from weeds. In planting largish trees it is well to prepare a pit for each before the winter preceding planting. In all cases weeds should constantly be removed until the branches of the trees fairly overshadow the ground. Trees should be planted from four feet apart (2,722 per acre) in the case of conifers, to six feet (1,210 per acre) or even farther. To accelerate the upward growth of the trees "nurses," such as quick-growing evergreen firs, are often planted between broad-leaved trees protecting them from wind and drought and checking weeds. In from seven to ten years the branches of these nurses will touch the more valuable trees, and periodical thinning should then be at once commenced. The thinnings will in this way be of some value as poles, etc., from the first. In thinning, any weak, malformed or unhealthy trees should be removed; but it is important, if long timber is desired, that the trees be not too much thinned, or side branches will be produced rather than length of stem. The rule should be to thin sufficiently to prevent interlacing of branches until the next rotation. For particulars concerning FRUIT-TREES and FRUIT-GROWING, see under these headings.

Arbor vitæ (*tree of life*), the popular name of the various cultivated species of the genera *Thuja* and *Biota*, coniferous evergreen trees belonging to the cypress tribe. Their leaves are minute and are arranged imbricately on vertically-flattened branches, which are apt to be mistaken for leaves. The whole plant is resinous, and, when bruised, aromatic. The two chief species are *Thuja occidentalis* from eastern North America, and *Biota orientalis* from China and Japan, neither of which grow to timber size in Britain. The group is abundantly represented in a fossil state in the Secondary rocks.

Arbroath, or ABERBROTHOCK, or ABERBROTHWICK, a seaport and royal burgh in the county of Forfar, Scotland, 17 miles north-east of Dundee, at the mouth of the little river Brothock, whence its name is derived. The Bell Rock Lighthouse is about 12 miles to the south-east, and the Abbey famous in connection therewith now forms a picturesque ruin near the town. Cardinal Beaton was the last of its mitred Abbots. In conjunction with Montrose, Forfar, Brechin, and Bervie, Arbroath returns a member to Parliament. Flax-spinning, jute-spinning, and the manufacture of sail-cloth are the chief industries. It is commemorated in *The Antiquary* as "Fairport." Pop. (1901), 22,987.

Arbuthnot, JOHN, M.D., a physician and literary man, who lived in the centre of the highest intellectual society of the reigns of Anne, George I. and George II., the son of a Scottish Episcopalian clergyman; he was born probably in 1675. After taking the degree of M.D. at Aberdeen he came to London, and for some time supported himself by teaching mathematics. He wrote some papers on the subject which attracted some notice, and being accidentally called in to attend Prince George of Denmark in 1702, he was some years later appointed physician to Queen Anne. About this time he must have come into contact with Swift, both of them working as pamphleteers and satirists for Oxford and Bolingbroke. His friendship with Pope, Gay, Parnell, Atterbury, and Congreve, soon followed. The death of Anne deprived him for a while of home and income, and just at this interval probably he and his friends started the Scriblerus Club, out of which grew other literary projects. In the meantime his medical practice grew, and he was appointed censor of the Royal College of Physicians. His health became somewhat infirm and in 1735 he died of asthma. *The Memoirs of Martinus Scriblerus* were perhaps wholly his. His letters show his wit, kindliness, and unaffected piety.

Arbutus, a small genus of shrubs belonging to the Heath tribe, natives of northern temperate regions, usually evergreen, and broad-leaved. The globose or subcampanulate, white or pink corolla, resembling that of the lily-of-the-valley, is deciduous, and the five-chambered, many-seeded ovary forms a berry-like fruit. A south-European species, *A. Unedo*, the Strawberry-tree, grows perhaps indigenously at Killarney. The scarlet, strawberry-like fruit is edible.

Arc, a continuous curve joining any two points. It is longer than the straight line joining them, which is called the chord. The length of a circular arc is proportional to the angle subtended at the centre, and to the radius of the arc. [CIRCULAR MEASURE.]

Arc, ELECTRIC, obtained by sending a sufficiently strong electric current from one carbon pencil to another. To start the action, as the extremely high resistance of the air space between the points would prevent the passage of the current, the carbon points must be made to touch and then be gradually drawn apart. A little of the carbon is volatilised, and so forms a conducting medium between the poles. Its electrical resistance is so considerable, however, that the temperature becomes very high, the carbon poles are rendered white hot, and an intensely brilliant light is emitted. Gold and platinum are readily vaporised, and diamond converted into black amorphous carbon, by the great heat of the arc. In arc lamps there are mechanical or other arrangements for regulating the distance between the two carbons, so that the light may not fluctuate as the pencils are burnt away. [ELECTRIC LIGHTING, INCANDESCENT LAMPS.]

Arca, the Ark-shell, a genus of LAMELLEBRANCHIATA (q.v.), of which several species occur on the English coasts. It is the type genus of the Arcadæ, a family which has existed since the Low Silurian period.

Arcachon, a fishing village and health resort in the department of the Gironde, France, about 30 miles west-south-west of Bordeaux, with which it is connected by rail, and on a large, almost land-locked, basin that serves as a harbour and a site for numerous oyster-beds. The dry, sandy soil of the Landes, the mild climate, and the vast extent of pine forests have caused Arcachon to be frequented by consumptive patients in winter, whilst visitors from the large towns of the south flock thither in summer for sea-bathing. There are several good hotels, a casino, and all the other attractions of a French watering-place.

Arcade, a series of arches upheld by pillars or columns, either open or closed by masonry behind. A more modern use of the term applies it to any gallery or passage lined with shops, as the Burlington or Lowther Arcades. The term is again applied to the row of arches or piers dividing the aisles of a church from the nave.

Arcadia, one of the ancient divisions of the Peloponnesus, in Greece, occupying the centre of the peninsula, surrounded by mountains, rugged, but interspersed with rich pastures, and possessing a cold climate. It was the home of the Pelasgi, and that primitive race was never much disturbed there by Dorian immigration. Until 668 B.C. the country was parcelled out amongst a number of small republics. Then a federation was established, and Megalopolis was built as its centre. The Arcadians joined the Achæan League in 228 B.C., and eighty years later became incorporated in the Roman province of Achaia. The inhabitants retained a simplicity of manners that commended them to the classical poets, and Arcadia has passed into later literature as the ideal abode of such shepherds and shepherdesses as Florian sang and Watteau painted. Another aspect of Arcadian character indicates that a considerable amount of shrewd knavery and dense stupidity was occasionally mingled with its rustic virtues.

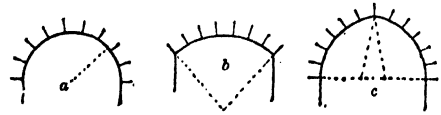
Arcadius, the first Emperor of the East, was born in Spain A.D. 383. At the death of his father Theodosius in 395 the Empire was divided, Honorius taking the western half with Rome as its capital, and Arcadius ruling the Eastern portion from Constantinople. His dominions extended from the Adriatic to the river Tigris, and from Scythia to Ethiopia. The young prince was too weak to assert his authority and gave way in everything to his ministers, or to his wife. He died despised and detested in 408.

Arcellina, the group of AMŒBÆ (q.v.) in which the soft body is protected by a shell of sand grains or chitin.

Arcesilaus, a Greek philosopher, born in Æolia about 318 B.C. He was a pupil of Polemon, and after travels in Greece and Persia established himself at Athens, where he founded the new or middle Academy, a school which opposed the Stoics with a kind of modified Platonism, and inculcated the doctrine of *acatalepsia* or the impossibility of ascertaining truth by means of the senses. He died in 241 B.C.

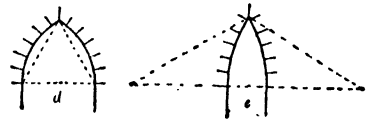
Arcestidæ, a family of AMMONITES with a long body chamber; it ranges in time from the period represented in England by the Coal-measures to that of the New Red Sandstone.

Arch, a constructional feature employed to span openings or cover over space, and built with stones or bricks, so arranged as to exercise mutual pressure, and thereby to support a superstructure. Arches are of several forms, the simplest of which are the semicircular (*a*) and the segmental (*b*), both



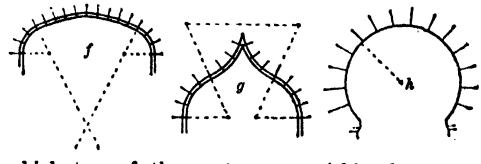
of which are struck from one centre. These forms are found in early Egyptian architecture, and the semicircular arch is a characteristic feature of the Assyrian, Etruscan, Roman, Byzantine, and Romanesque styles.

The pointed arch is struck from two centres, the two curves meeting in a point at the top (*c*). When



the centres coincide with the sides of the arch, it is called equilateral (*d*). When they are without the curve, the arch is called lancet (*e*).

The pointed arch is a stronger form than the semicircular, and its earliest example is found in the vaulted drains at Nimroud in Assyria. It is a characteristic feature of the Gothic or Pointed styles, and is supposed to have been derived from Saracenic examples in Syria and Egypt, where it was employed as early as the eighth and ninth centuries. In the fifteenth century, in English Gothic, an arch was employedwhich is struck from four centres, and is known as the four-centred or Tudor arch (*f*). About the same period was used a four-centred arch called the ogee (*g*), and of

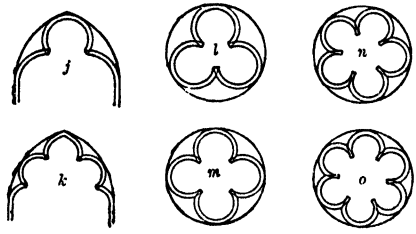


which two of the centres are within the curve, and two above it. This arch is characteristic of late French Gothic architecture known as "flamboyant;" it is found occasionally in English architecture, and is a well-known feature of Venetian Gothic. In French flamboyant architecture of late fifteenth century work there is found also a three-centred arch.

The horseshoe arch (*h*) is a semicircular arch, the curve of which is carried down below the centre. This arch is characteristic of Moorish work in Spain, Morocco, and Tunis. In Saracenic

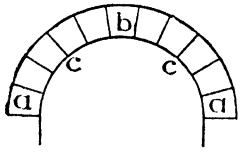
architecture in Egypt and Syria the arches are sometimes horseshoe and pointed. The earliest example known of the horseshoe arch is found in Persia.

Besides these arches there are others of a more decorative form called foiled arches: they are known as trefoil (*j*) and cinquefoil (*k*), according to the number of the foils; the junction of two foils, viz. the point where they meet, is called a cusp. Sometimes a complete opening is formed with foils,



the distinguishing terms being as before, trefoil (*l*), quatrefoil (*m*), cinquefoil (*n*), sexfoil (*o*). Foiled arches are found in Western Europe employed from the thirteenth century to the fifteenth century. They were also characteristic features of the Moorish style, being found in the Great Mosque at Cordova, and in the Alhambra.

An ordinary arch is built on what is called a centre, framed in timber to support the stones of the arch until they are all in position. The blocks of a true arch are of a wedge-shaped form, and are called arch-stones or voussoirs. The lowest block, *a a*, on which the arch rests is called the springer, and its upper surface is known as the skew-back. The topmost stone is called the keystone (*b*), and is the last inserted. In true Gothic arches there is no keystone, the junction of the two sides being a vertical line.



The inner surface of the arch (*c*) is called the soffit or intrados, the outer or upper surface the extrados. That portion of the arch which lies between the springer and the keystone is called the haunches. The portion of wall above the arch on each side is called the spandril.

Arch, TRIUMPHAL, an arch erected in honour of some individual, or in commemoration of some triumph. The practice of erecting such arches was common among the Romans.

Archæan (from the Greek, *archē*, the beginning), the name given to the oldest known rocks, which from their prevailing character are also termed the Crystalline Schists. They contain no certain traces of organic life, and it is doubtful whether they originated as crystalline precipitates from a primitive heated nebulous atmosphere, or have been ordinary sediments strongly metamorphosed.

Archæocidaridæ, a family of Palæozoic Sea Urchins, of which Archæocidaris is the type; it occurs in the Carboniferous (q.v.) and Permian systems (q.v.).

Archæocyathus, a genus of Cambrian sponges, once supposed to have affinities with the FORAMINIFERA (q.v.).

Archæologic. [PALÆOLITHIC.]

Archæology, (Gk. *a discourse upon what is ancient*), the science which treats of antiquity; the science by which we acquire knowledge of ancient times by studying the relics and traditions of those times. Archæology is divided into various branches. For instance, that particular branch which is connected with written books is termed Bibliography (q.v.); while that which investigates written manuscripts is known as Palæography (q.v.). The prehistoric period of mankind is divided by archæologists into various ages, the Stone age (which is again subdivided into the Palæolithic and the Neolithic ages), the Bronze age, and the Iron age, information concerning which will be found under the separate headings. There are a great many societies in existence which profess the study of archæology, the best known and oldest established being the Society of Antiquaries of London and of Scotland. Further information respecting particular objects of archæological research may be found under such headings as ARROW-HEADS, FLINT IMPLEMENTS, LAKE-DWELLINGS, SPINDLE-WHORLS, STONE-WHORLS, etc. etc.

Archæopteryx (from the Greek *archaiōs*, ancient; *ptĕryx*, a wing), the oldest known fossil bird, is found in the lithographic limestone of Solenhofen in Bavaria, which is of the age of our Kimmeridge Clay. It was about the size of a rook: like all known Secondary birds, it was furnished with true teeth; and like the unhatched ostrich, it had claws on its wings; but, unlike all other birds, its tail was prolonged in a lizard-like manner with a pair of feathers from each caudal vertebra. It is, therefore, the type of a distinct order, the *Saururæ*. The head is preserved in the Berlin Museum, and a fair specimen of the rest of the body in the British Museum.

Archangel, a seaport town on the Dwina, near its mouth in the White Sea, on the northern coast of Russia. The province, which bears the same name, has an area of 331,500 square miles. The town has an extensive commerce for six months of the year, during the remaining six it is blocked with ice. It exports chiefly grain, flax, linseed, pitch and mats, while its imports comprise fish, tea, coffee, and oil. Before the foundation of St. Petersburg, Archangel was Russia's only port. It possesses a fine gymnasium, bazaar, ecclesiastical school, a marine hospital, and a school of navigation.

Archangel, a chief angel, an angel of superior rank; the archangels were supposed by the Jewish fathers to be seven in number, Gabriel, Michael, Uriel, Raphael, Chamuel, Jophiel, and Zadkiel.

Archasteridæ, a family of Starfish ranging from the Jurassic to the present.

Archbishop, a chief bishop. The office is of considerable antiquity in the annals of Christianity, and in England dates back to 597 A.D. In the English Church there are two Archbishops, the one of Canterbury, styled the Primate of all England, the other of York, called Primate of England. The Archbishop of Canterbury, whose office is the more important of the two, ranks immediately after princes of the royal blood, and before all other subjects; he has the privilege of crowning the Sovereign, is *ex officio* a member of the Privy Council, and besides his episcopal duties is practically the medium of communication between the Church and the Ministers. The Archbishop of York ranks after the Lord Chancellor as a prince, and has the privilege of crowning the Queen Consort. He is also a member of the Privy Council, and has jurisdiction over the Archbishopric of York. An archbishop may be appealed to from any decisions of the bishops within his diocese, over whom it is his function to exercise supervision. The Archbishop of Canterbury is moreover empowered to grant degrees. There are two Archbishops of the Church of England in Ireland, of Armagh (Primate of All Ireland), and of Dublin (Primate of Ireland); there are none in Scotland. In the Roman Catholic Church there is only one Archbishop for England, viz. the Archbishop of Westminster; while there are two for Scotland of the sees of St. Andrew's with Edinburgh, and Glasgow, and no less than four for Ireland, viz. of Armagh, Dublin, Cashel, and Tuam.

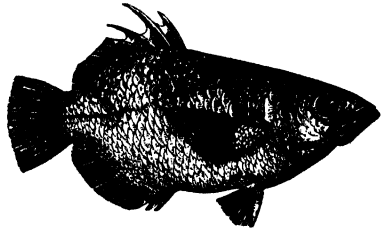
Archdeacon, literally, a chief deacon. The term, however, is applied in the English Church to a functionary next in rank to a bishop, having jurisdiction over his archdeaconry, which forms a part (formerly in some cases the whole) of the diocese. Archdeacons may hold a court from which appeal can be made to the bishop.

Archegonium, an organ in the sexual stage of the higher cryptogamic plants (q.v.) containing the germ-cell. In gymnosperms (or naked-seeded plants) it is represented by the *corpusculum* (q.v.), and in angiosperms (or plants whose seeds are enclosed in an ovary) by the *synergidæ* (q.v.).

Archelaus, (1) a Greek philosopher of the fifth century B.C. Being a disciple of Anaxagoras, he held most of the physical theories of his master, and is said to have had an idea of the sphericity of the earth. In morals he taught that custom made the only distinction between right and wrong. (2) The natural son of Perdiccas, King of Macedonia. He killed the legitimate heirs and usurped the throne about 413 B.C. In spite of this he is stated to have been a wise and liberal monarch, encouraging the arts of civilisation. Euripides was a guest at his court. He was assassinated by Cratæus in 399. (3) A general of Mithridates the Great, who was at first successful against the Romans, but being afterwards defeated by Sylla fell into disgrace and fled to Rome B.C. 81. (4) Son of Herod the Great, who disputed the succession with Herod Antipas, and was seated on the throne as ethnarch by Augustus, A.D. 1. His reign was marked by oppression and bloodshed. It is said that he slew three thousand Jews because they remonstrated against his bringing a Roman standard into the temple during the Passover. At the prayer of his subjects he was deposed in 7 A.D. and banished to Vienne in Gaul, where he died.

Archenteron, the central cavity found in the embryos of most animals (stage Blastula): it is formed by the segments into which the egg or ovum divides, arranging themselves as a hollow sphere [BODY CAVITY.]

Archer Fish, a popular name for *Toxotes jaculator*, of the Acanthopterygian family Squamipennes, from its singular habit of ejecting a tiny stream of water from its mouth over insects at rest on plants near, or flying above the surface, and so causing them to fall in, when they become an easy prey. It is six or seven inches in length, ranging from the East Indies to the north coast of Australia. The Malays keep it in captivity and place insects near it, in order to witness this



ARCHER-FISH (*Toxotes jaculator*).

curious habit. The same act is erroneously attributed to *Chelmo rostratus*, a fish of the same family and nearly the same habitat. Dr. Günther says that the long tube into which its snout is produced "rather enables it to draw from holes and crevices animals which it could not otherwise reach."

Archer's Dart (*Agrotis valligera*), an English moth, the larva of which feeds on the roots of grass.

Archery, the art of shooting with a bow and arrows. Archery is mentioned in Genesis, and frequently referred to both in the *Iliad* and the *Odyssey*, in the latter of which books much is made of the bow of Ulysses. In Egypt and Assyria, too, traces are found which indicate the great age of this art. The English seem to have excelled in the art, and, according to the histories, the victories of Crecy, Poictiers, and Agincourt were in great part, if not wholly, due to the valiant English bowmen. The introduction of fire-arms naturally caused the decay in the art of archery, and after its abandonment as a military art, took its place as a recreation. In this capacity it enjoyed a long popularity, and is still in high favour with a number of devotees. Several societies of archers exist both in England and in Scotland, among the oldest established being The Royal Toxophilite Society, the Royal Company of Archers, and the Woodmen of Arden. [BOW.]

Arches Court, a Court of Appeal belonging to the Archbishop of Canterbury, the judge of which is called the Dean of the Arches, because his court was anciently held in the Church of St. Mary-le-Bow (Sancta Maria de arcubus). Provision was made for the appointment of a new Ecclesiastical Judge (who was appointed soon after the passing of the "Public Worship Regulation Act," 1874), it being enacted that whenever a vacancy should occur in the office of Official Principal of the Arches Court of Canterbury, the judge should become *ex-officio* such official Principal, and all proceedings thereafter taken before the Judge in relation to matters arising within the province of Canterbury should be deemed to be taken in the Arches Court of Canterbury. In the province of York the analogous office is termed "The Chancery Court."

Archiannelida, an order of ANNELIDA, including the families Histriodrilidæ and Polygordiidæ; they all are marine and their characters are very primitive. Thus the nervous system is retained as two threads on the sides of the body, instead of passing inwards and downwards, forming a double chain on the under or ventral side. The nephridia, or organs of excretion, are simple. The division of the body into "segments" or rings is feebly marked; most of these segments are alike, but the first segment (prostomium, *i.e.* before the mouth) is small, and the second (peristomium, *i.e.* around the mouth, which is situated in this segment) large. The head cavities are true ARCHICŒLES (q.v.). For explanation of terms, etc., see NEREIS.

Archichætopoda, an order of CHÆTOPODA (or bristle-bearing worms), which contains Saccocirrus, a small worm from the Mediterranean and Black Sea. In the position of the nervous system and the proportions of the two first segments of the body it agrees with the ARCHIANNELIDA. It differs, however, in the presence of bristles, etc.

Archicœle, a body cavity or a CŒLOME (q.v.), which is part of the BLASTOCŒLE, *i.e.* of the original body cavity of the larva: such are the head cavities of Archiannelida, the body cavity of ROTIFERA (q.v.).

Archil, or ORCHIL, a purple dye obtained from lichens. The colouring matter of Archil is soluble in water and alcohol, but has no reputation for durability.

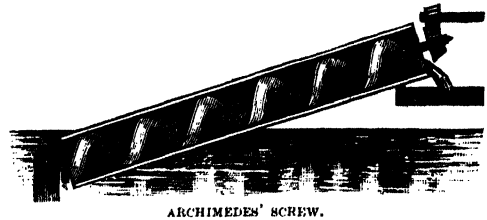
Archilochus, of Paros, a famous lyric poet of Greece, flourished at the beginning of the seventh century B.C. Urged by poverty, he is said to have left his native place, and settled with a colony at Thasos, but his vein of sarcasm made him so offensive that he had to migrate once more. Little is known of his subsequent career, but tradition reports that he was killed in a war between the Parians and Naxians, and buried by the sea-shore. His verses—chiefly iambic—breathed, we are told, the bitterness of his spirit, and attacked friend and foe alike. His *Hymn to Hercules* won the prize at Olympia. The few fragments handed down to us give no idea of his genius, and scarcely confirm adverse criticisms. They reveal rather a manly, vigorous nature, influenced by theistic fatalism.

Archimandrite (Gk. *ruler of the fold*) the title of the highest order of superiors of convents in the Greek Church.

Archimedes, of Syracuse, the father of natural philosophy, and by far the greatest mathematician and engineer of antiquity, was born about 287 B.C. He was, according to Plutarch, a relative of King Hiero, and he certainly received the patronage and support of that sovereign. He is said to have visited Alexandria in order to hear Euclid, and to have begun his practical career by draining Egyptian marshes and embanking the Nile. The fragments of his works yet extant show extraordinary mathematical ability, dealing with such subjects as the relations between the volumes of a sphere and a cylinder; the measurement of the area of a circle; the ratio of the circumference to the diameter; the application of conic sections to solid geometry; the quadrature of the parabola; the centre of gravity of planes; and the equilibrium of floating bodies. The principle of the lever was so thoroughly appreciated by him that he is reported to have exclaimed, "Give me a lever of sufficient length, and a point to rest it on, and I will move the earth." When the Romans under Marcellus besieged Syracuse in 212 B.C., he exerted himself actively to contrive means for its defence, and set fire to the hostile fleet by a combination of mirrors and burning glasses. He was killed during the assault on the town, though Marcellus had given special orders that he was to be spared.

Archimedes' Principle, in Hydrostatics, the principle that a fluid exerts a resultant upward force on any body immersed in it, exactly equal to the weight of the fluid displaced by the body. If, therefore, the weight of the body be less than that of the fluid displaced, there will be a tendency for it to move upwards, as in the case of a balloon. If equal to the weight of fluid displaced, the body will remain at rest in any position within the fluid. But if greater, the body will tend to sink. [SPECIFIC GRAVITY and HYDROSTATICS.]

Archimedes' Screw, a mechanical contrivance for elevating water, named after its inventor. In its simplest form, this is a hollow spiral placed in an oblique position with its lower



ARCHIMEDES' SCREW.

end in water. When rotated about its axis, water enters at this end, and is lifted up by the screw

action. If the rotation were reversed, the water would be lowered again.

Archinulidæ, a family of Carboniferous *Chilognatha* (Centipedes). Archiolus and Xylobius are the two principal genera.

Archipelago (Gk. *the chief sea*), the term originally applied only to the sea lying between Greece and Asia Minor, but now extended to any other sea resembling it in having a number of islands. The name is also given to the islands themselves. The islands in the Grecian Archipelago are divided into two groups: the *Cyclades*, containing Delos, Paros, Tenos, Andros, Naxos, Melos, and others, and the *Sporades*, of which the principal islands are Samos, Lesbos, Patmos, Cos, Lemnos, Rhodes, Chios, Samothrace, and Icaria. Other well-known archipelagoes are the Malayan, the Patagonian, and the Marquesas.

Architecture, the art of design in building. It is the term given to that quality of thought, of arrangement, and of design in a building which distinguishes it from ordinary construction. Architecture is both a science and an art: a science in that it has to deal with materials of various kinds, and to utilise them in the best way, taking into consideration their durability, hardness, tenacity, endurance, and other qualities, all of which are defined by the natural laws of science. Further, it requires a knowledge of mathematics, of mechanics, and of the laws relating to heating and ventilation, etc. Architecture is also an art in that it calls for the exercise of imagination, of judgment, and of taste in the design and construction of buildings of various kinds, which must not only be conveniently arranged for several purposes, but should show a sense of order, regularity, symmetry or balance, of fitness, good proportion, study of mass and outline, a sense of stability and durability beyond the mere scientific requirements, a character or style suggesting the destination of the building, and in short all those characteristics which constitute a sense of beauty of form, whether the building be of the simplest kind or of a monumental character.

Architecture is regarded as a creative art in opposition to painting and sculpture, which are imitative arts. This is only partially true, for whilst its elements are more purely original than those of the other arts, in its second phase it is to a certain extent imitative of its original types. Thus the first ordinary requirements of mankind having been met by constructions of the simplest kind, such as mud huts built with crude or unburnt bricks, or wigwams constructed with branches of trees consolidated and protected by mud coverings, the features of these created forms—created because they do not exist in nature—have been afterwards copied as an element of decoration in a more lasting and a more durable material.

Thus the early temples and tombs of Egypt suggest by their form and in their decoration the crude brick huts of the earliest erections. The temples of the Greeks and the tombs of the Lyrians betray throughout the wooden prototypes of an earlier civilisation. In both these cases it is not difficult to trace the origin of their forms and decoration; the task, however, becomes more complicated when, in addition to the simpler forms first created as above stated, we have to deal with the influence of other pre-existing styles, an influence exerted by constant migrations of races, bringing with them in some cases a new and a foreign method of building, and in others a recollection, more or less vague perhaps, of forms unknown in their new settlements.

The styles of architecture therefore, as they are now known, have been formed by a gradual growth of elements, sometimes based on simple created forms, sometimes copies more or less varied of preceding styles. There are some styles, such as the Egyptian and the Assyrian, which are purely original, uninfluenced by one another or by any preceding styles. There are others, like the Persian, the Greek, and the Roman, which have been developed according to requirements, race, and religion, and which contain in their earlier and more primitive forms the decorative and sometimes the constructive elements of the Egyptian and the Assyrian; the Greek again borrowing from the Persian, and the Roman from the Greek.

This system of copying, or of attempting to copy, has been the chief characteristic of the first or archaic period of every style, and it exists more or less down to the present day, with this important and wide distinction, however, that since the revival of letters and the publication of illustrations of ancient buildings a new element has crept in, and the traditional style of a country has been passed over in favour of one of exotic growth, which, for the moment, at all events, has enlisted the sympathies of the learned, and has become a fashion, to be set aside again and again in favour of some still more modern discovery. Thus, in the fifteenth century in Italy there took place a revival in favour of the ancient architecture of the Roman Empire, with such modifications and developments as became requisite to meet the new demands of civilisation. A century later the influence of those who were known as the Italian masters (for hereafter the style was known by the name of the man, and not of the country or period) spread to other European countries, and in England is found in the works of Inigo Jones, of Sir Christopher Wren and of his followers, and still later by Sir Robert Chambers. Again, in the 19th century there were three distinct modern revivals: (A) the Greek, owing its origin first to the works of the Dilettanti Society and to their publications of the temples of the Greeks, and secondly to the revelation to the artistic world caused by the bringing over of the Elgin marbles; (B) the Gothic revival, owing its origin partially to a religious movement in England, and partially to an archæological and historical interest in favour of ancient English architecture; and (C) a semi-Classic revival known popularly as "Queen Anne," in which there was a return to the decorative elements of Classic art, based, however, on a free interpretation of their usage, and no longer bound by the principles of Italian architecture.

The influences of race and of religion, which to a certain extent may be taken together, have always

NAWAB SALAR JUNG BAHADUR.

ARCHITECTURE.—I.

1 SAXON. 2. NORMAN. 3. EARLY ENGLISH. 4. DECORATED. 5. PERPENDICULAR. 6. ELIZABETHAN.
7. DORIC. 8. IONIC. 9. TUSCAN. 10. CORINTHIAN. 11. COMPOSITE.

been leading factors in the type of building created. In the Egyptian and Greek styles, for instance, the principal buildings have been those of a religious nature, whether in the forms of temples or tombs. With the Assyrian, the Persian, and the Roman styles, palaces, or buildings akin to them, by the extent and number of those, the remains of which have been traced, would seem to have been more in accord with the requirements of the people. In the creation and development of the earlier styles, however, there is another element which has been paramount in deciding the nature of their forms and of their construction, and this element is the nature of the material obtainable in the country itself.

The great problem of all ages has been to seek for the simplest, most economical, and most durable method of covering over space. On the solution of this problem may be said to depend the origin, growth, and development of all architectural styles. If we may judge by the representations carved on the earliest rock tombs of Egypt, the method of construction adopted by the Egyptians in their primitive state (and in humble dwellings it is still traditionally carried on down to the present day) was to roof over their houses or huts with palm-tree trunks, covering them with a layer of earth or mud to keep out the intense heat of a tropical sun. Owing, however, to the proximity of two ranges of hills, the Arabian and Libyan ranges, to the banks of the Nile, and the facility of transport which that river afforded, the Egyptian builder had at his disposal good stone of various qualities; and already prior to from 3,000 to 4,000 years B.C. he had learnt how to quarry, work, and transport large masses of stone which took the place, firstly of the crude brick walls hitherto employed, and secondly afforded a more lasting and more durable covering to their temples than palm-tree trunks could give. If the halls or chambers he desired to cover over were too wide to allow of single slabs of stone covering them, by adopting rows of piers or columns carrying beams of stone he could obtain additional support and increase the space covered over to any extent. The adoption of a circular or polygonal column would interfere less with the space occupied than the square pier, and in this way columnar architecture was first created. The technical term given to this construction is trabeated, from *trabes*, a beam, and the styles in which are columns carrying beams, either of stone or wood, on their upper mouldings or capitals, are known as the trabeated styles. The Egyptian, the Persian, and the Greek styles belong to this class. When, however, we come to the Assyrian style, we find ourselves in presence of another combination created in the flat alluvial lands of Mesopotamia; on the banks of the Tigris and of the Euphrates there was no stone at its disposition, or even timber of sufficient size and strength. The Assyrian builder was obliged therefore to cover over his hall and gateways by the use of the arch or vault. It is still a matter of dispute as to whether the large halls could have been covered in this way; as, however, no traces of columns or piers have been found, or, what is more important, of the foundations necessary to carry such features, there is absolutely no alternative but the vault. The principle of the arch [ARCH] was known long before the erection of the Assyrian palaces; vaults in stone are found in the vicinity of the Pyramids, and there exists down to the present day, behind the Ramesseum at Thebes, the vaulted granaries of Rameses II., built some four to five centuries before the earliest Assyrian palace (Nimroud) yet excavated. The drains of this palace were properly constructed with voussoirs [ARCH, CONSTRUCTION], and in the palace at Khorsabad great gateways have been found, spanned by arches of regular construction, showing that their builders were not only acquainted with the principles, but knew how to build them in a thoroughly scientific way. To this system of construction the term arcuated, from *arcus*, a bow, is given, and the Assyrian, the Etruscan, the principal buildings of the Roman and the Saracenic styles, only to quote the earlier types, all are arcuated styles. The Roman architect borrowed the trabeated style from the Greeks, and reproduced it in his own way, as a constructional form, in the temples; as a decorative form, in the great amphitheatres. He adopted the arcuated style of the Etruscans and developed it in the great thermæ or baths, and (for the constructive part) the vaulting of the passages and openings of the amphitheatres. In the earlier basilicas the trabeated style was always employed, the central halls or nave being covered with timber roofs. In the basilica commenced by Maxentius and finished by Constantine, the arcuated style is adopted, the type of building produced being that which was employed for the great central hall, the tepidarium of the Roman thermæ or baths.

Constantine, when he transferred the capital to Byzantium (now Constantinople) would seem at first to have employed the basilica plan for the churches which he erected there and throughout Syria, that being the simplest and most economical method of covering over a large space; and except that the columns dividing the nave from the aisles might have carried arches instead of beams, the style was virtually a trabeated one, because a ceiling with trussed beams formed the roof. Constantine seems, however, to have foreseen the necessities of adopting a more permanent and incombustible method of roofing over space, but it was reserved for one of his successors, Justinian, to create a new style by the adoption of the dome or pendentive; the Church of St. Sophia, at Constantinople, being the masterpiece of the Byzantine, the next arcuated style developed. From this period (seventh century) onwards the arcuated style has always prevailed, and the Saracenic style (based on the Byzantine, but introducing two new forms of arch, the horse-shoe and the pointed), the Romanesque style, as developed in Lombardy, on the borders of the Rhine, in various parts of France, and in England (where it is known as Saxon and Norman), are all various growths of the arcuated style. In the middle of the twelfth century, in France, the pointed arch, erected in the East, was introduced both into the arch and vault, and revolutionised the methods of building, producing what is known as the Gothic or Pointed style, which lasted (at all events in France, Germany, Spain, and England) till the close of the fifteenth

century. Since then the trabeated style has again been occasionally employed, but the economy of arcuated construction, except when iron girders are employed, leads to its being almost universally adopted.

It will be seen, therefore, that trabeation depended mainly on the employment of large masses of stone and of beams of wood; arcuation could be adopted with materials of small dimension. In this sense the use of the material brick has not been without its influence in those countries where stone was not to be had; and throughout the North of Germany and in Holland during four or five centuries brick has led to a variety of new forms, sometimes, however, attempted copies of stone construction. For the last two centuries in England it has been generally made use of, and within the last twenty years has come again to the fore, and its adoption in conjunction with terra-cotta, both employed as genuine building materials, not to be hidden beneath cement or stucco, has led to what might almost be called a new development of style.

Architeuthis, one of the largest of living Cuttlefish: it occurs especially in the North Atlantic.

Architrave, in *Architecture*, the lowest part of the entablature (q.v.) of an order, resting immediately upon the capital itself. The term is also sometimes applied to the vertical and horizontal mouldings round a door-frame.

Archivolt, in *Architecture*, the mouldings which are carried round a classic arch.

Archon (Gk. *a ruler*), the name given to the magistrates who succeeded the kings in Athens. Originally the office was held for life and was hereditary, but later this was abolished and the tenure of the office limited to ten years, and later still to one year; the number of archons was then nine, the chief archon being called *Archon Eponymos*, who gave his name to the year; the second was styled *Archon Basileus*, who filled the office of high-priest; the third was called *Polemarchos*, who acted as leader in war. The remaining six were known as *Thesmothetæ*, or law-makers.

Archytas, of Tarentum, an eminent Greek philosopher, mathematician, soldier and statesman of the fifth century B.C. He is reported to have led his fellow-citizens seven times in battle and always with success. According to Diogenes Laertius he was a friend and instructor of Plato, and two letters that passed between them are preserved. A follower of Pythagoras, he made an enormous advance by applying the inductive method to physical science, and in practical mechanics he is credited with having invented the screw and the pulley, and with having constructed a flying pigeon and other automata. The fragments which we possess of his works show that his mind was engaged in various and diverse speculations—moral, mental, logical, mathematical, and physical.

Arcis-sur-Aube, a town in the department of Aube, France, about 18 miles north of Troyes on the left bank of the river Aube. Danton was born here. A severe battle was fought close by in 1814 between Napoleon and the Austro-Russian army under Schwartzenberg. The chief manufactures are yarn and cotton stockings.

Arcos de la Frontera, a town, and formerly a duchy, in the province of Andalusia, Spain, on the river Guadalete, 30 miles from Cadiz. Thread, ropes, and leather are the principal manufactures, and it is the first place in which leather-dressing was practised in Andalusia. There are several other towns named Arcos in Spain and Portugal.

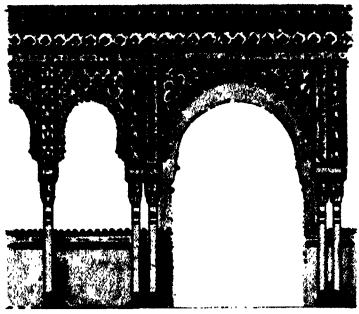
Arcot, North and South, are two maritime districts in the Madras presidency, British India. Their united area amounts to 9,925 square miles. The country was ceded to the East India Company in 1801 by Azimul-Omrah, the Nabob of the Carnatic. The interior is mountainous and thickly wooded.

Arcot, the chief town of the above province, is on the river Palar, 65 miles from Madras by railway. It was the residence of the nabobs of the Carnatic, and contains a palace and other monuments. Clive captured the fort in 1751 with a force of only 500 men, and this was his first military achievement.

Arctia, the Tiger Moth.

Arctic Expeditions, voyages of discovery which have been made towards the North Pole and in the Arctic regions. Voyages similarly made to the South Pole are termed Antarctic expeditions, while both these kinds come under the head of *Polar Expeditions*. As there is a much greater surface of land in the Arctic regions than in the Antarctic, the temperature is consequently higher in the regions of the North Pole, and has therefore proved a greater attraction to explorers. The first genuine voyage of discovery made to the Arctic regions was made in 1603 by one Stephen Bennett, who was followed very shortly (1607) by the famous Hudson (q.v.), who reached the latitude of 81° 30′ before he was compelled to retire. Various minor expeditions followed this, but it was not until 1773 that Captain Phipps, commanding an important expedition, fitted out for scientific purposes alone, succeeded in reaching lat. 80° 48′. Captain Cook, Scoresby (who penetrated to 81° 30′), Buchan, Franklin, Clavering, and others, all made unsuccessful attempts, but in 1827 Captain Parry passed beyond the latitude reached by Hudson, and succeeded in getting as far as 82° 40′. In 1845 Sir John Franklin (q.v.) started on an expedition to discover a north-west passage and never returned, for an account of his death in 1847 was found and brought home by M'Clintock in 1859. Nansen succeeded in reaching latitude 85° 57′ in 1896; and the Duke of Abruzzi's expedition, latitude 86° 33′, in 1900. The attempt of Wellman in August, 1909, to reach the North Pole by airship resulted in failure; but Peary, who returned late in 1909, was successful in reaching there. [Arctic Sea.]

Arctic Sea, The, is the name given to the great body of water that lies within the Arctic Circle, *i.e.* N. of 66° 30′ N. lat. In common parlance the term is extended to such portions of the ocean



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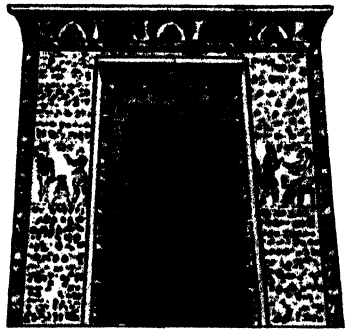

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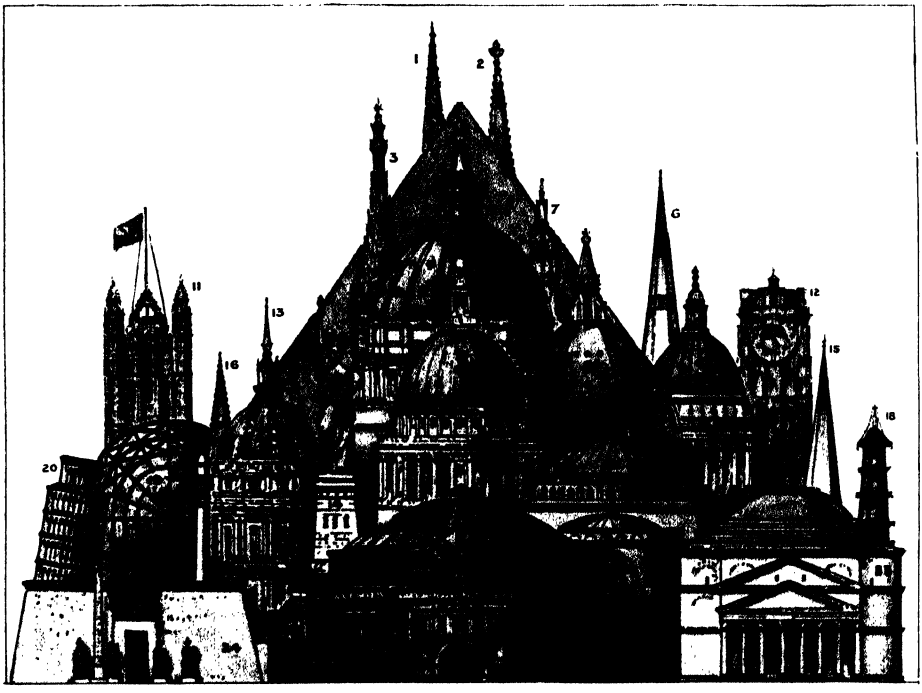


GROUP OF BUILDINGS SHOWING COMPARATIVE HEIGHTS.

1. ULM CATHEDRAL, 530 FT.
2. COLOGNE CATHEDRAL, 510 FT.
3. STRASBURG CATHEDRAL, 468 FT.
4. GREAT PYRAMID, 460 FT.
5. ST. PETER'S, ROME, 448 FT.
6. SALISBURY CATHEDRAL, 404 FT.
7. ANTWERP CATHEDRAL, 403 FT.
8. DUOMO, FLORENCE, 376 FT.
9. ST. PAUL'S, LONDON, 360 FT.
10. ST. ISAAC'S, PETERSBURG, 336 FT.
11. VICTORIA TOWER, WESTMINSTER, 331 FT.
12. MALINES CATHEDRAL, 320 FT.
13. HOTEL DES INVALIDES, PARIS, 310 FT.
14. STATUE OF LIBERTY, NEW YORK 306 FT.
15. CHICHESTER CATHEDRAL, 271 FT.
16. LICHFIELD CATHEDRAL, 252 FT.
17. MONUMENT, LONDON, 202 FT.
18. PORCELAIN TOWER, NANKIN, 200 FT.
19. TRANSEPT, CRYSTAL PALACE, 198 FT.
20. LEANING TOWER, PISA, 188 FT.
21. MOSQUE OF ST. SOPHIA, 182 FT.
22. ALBERT HALL, 154 FT.
23. PANTHEON, ROME, 143 FT.
24. LUXOR, EGYPT, 75 FT.

as are under the same physical conditions as those actually inside the circle. Lieutenant Markham in Sir George Nares' expedition in 1876 reached 83° 20′ 26″ N., while Nansen in 1896 reached 85° 57′, Abruzzi's party 86° 33′ in 1900; and in the later months of 1909 Dr. Cook claimed to have discovered the North Pole, and to have left there proofs of his travels. Almost simultaneously Commander Peary, who during the previous twenty-three years had led several arctic expeditions, arrived back and announced his own claim to the distinction. A heated controversy resulted, the honour of being the first to discover the North Pole being generally accorded to Peary. Sir G. Nares' investigations confirmed the existence of a vast Polar Basin, having an area of one-and-a-half million square miles. The chief entrances to it are by Behring Strait, Smith Sound, and Jones Sound at the extremity of Baffin Bay; the channel between Greenland and Spitzbergen; and that between Spitzbergen and Nova Zembla, into which the Gulf Stream penetrates. From the end of September to the beginning of May no sun is visible in this desolate expanse. Animal life exists up to a very far point; Markham found in lat. 83° 20′ 26″ N. swarms of small crustaceans, and footprints of the Polar hare have been seen as far North as lat. 83° 10′. Cold currents appear to flow downward from the Pole through most of these passages. Numbers of islands form a characteristic feature of this portion of the earth's surface, ranging from the size of Greenland to mere specks in the sea. The sole inhabitants within the circle are the Esquimos. The white bear, hares, foxes, ptarmigan, and a few aquatic birds constitute the fauna of the lower latitudes, and the sea abounds in seals, walruses, whales, and fish of many kinds.

Arctisca. [TARDIGRADA.]

Arctogæa, a primary zoological division of the land surface of the earth proposed by Prof. Huxley in 1868. It is equivalent to the Nearctic, Palearctic, Ethiopian, and Oriental regions of Mr. Sclater. [NOTOGÆA.]

Arctoidea, a section of fissiped Carnivora, containing the families MUSTELIDÆ (Weasel-like, Otter-like, and Badger-like forms), PROCYONIDÆ (the Raccoon and its allies), AILURIDÆ (the Panda), and URSIDÆ (Bears).

Arcturus, *α* BOÖTES, the chief star in the constellation Boötes. It is of the first magnitude, and at an approximate distance of 3,000 billion miles. The amount of heat received from Arcturus has been roughly estimated by direct experiment, it being found to equal that of a 3-inch cube of boiling water at a distance of about 400 yards.

Arcus Senilis, the opaque zone which develops with advancing age at the outer part of the cornea. It appears earlier and becomes more marked in some persons than in others, and being due to a process of degeneration has been supposed to serve as an index of the degree of degenerative processes existing in other parts of the body. It is by no means to be relied on in this particular.

Ardabel, or ARDEBIL, a town of Persia, in the province of Azerbijan, on the river Karasu, a tributary of the Aras, about 40 miles from the Caspian Sea. The tomb of Shah Ismael Sufi, founder of the Sufi dynasty, stands in the town.

Ardèche, a department in the south-east of France, separated by the Rhone from Drôme on the east, bounded by Lozère and Haute Loire and Loire on the west, and by Gard on the south. It has an area of 2,134 square miles. The country is mountainous, being nearly traversed by the Cevennes, and marked by ancient volcanoes, the chief of which is Mont Mézenc. The products are wine, chestnuts, olives, silk, and cattle. Leather, woollens, silks, and cottons are manufactured. Privas is the capital.

Ardennes (Kelt. *forest*), *Arduenna Sylva*, a vast tract of rugged woodland lying on the confines of France, Belgium, and Rhenish Prussia. In Roman times it was far more extensive. At present the French portion, lying within the department to which it gives its name, covers some 600 square miles. The department of Ardennes is bounded north by Luxembourg, west by the department of Aisne, south by that of Marne, and east by that of Meuse. It has an extreme length of 63 miles and its breadth is 60 miles, the area being 2,021 square miles. The soil is fertile in the south-west, but woods, limestone rocks and chalk prevail in other parts. The chief rivers are the Meuse and the Aisne with their affluents. Corn is grown in abundance, and numbers of horses, cattle, and sheep are raised, but cider and beer take the place of wine. Iron is worked in the district, where 150 mines are said to exist, and there are stone, slate, and marble quarries, factories for cloth and woollen goods, and glass-works. Mézières, Rathel, Rocroy, and Sedan are the chief towns.

Ardglass, a town in County Down, Ireland, at the head of a small bay, 8 miles south of the entrance to Strangford Lough. After the Conquest it became a place of some importance, as is shown by the ruins of five Norman castles in its vicinity. The harbour is good, being accessible to vessels of 500 tons at all states of the tide.

Arditi, LUIGI, a musician and composer, born in Italy 1822, educated at the Conservatoire of Milan. In 1839 he appeared as a violinist, and in 1841 he produced an opera *I Briganti*. In 1857 he came to London, and for twenty years was conductor at Her Majesty's Theatre. He died in 1903.

Ardnamurchan, a promontory, cape, and village in the north of Argyleshire, Scotland. It is the most westerly point in the mainland of Great Britain, and is capped by a lighthouse built in 1849.

Ardoch, in Perthshire, twelve miles N.N.E. of Stirling, celebrated for a Roman camp, the best preserved in Britain.

Ardrossan, a seaport of Ayrshire, Scotland, 16 miles north from Ayr, and 21 south-west from Glasgow. The harbour with its docks is one of the best on the west coast. Iron foundries and

ship-building yards are established here, and there is a considerable trade in coal and iron. Steamers run to Ireland and elsewhere. Many people visit the place for bathing in the summer. On a hill stand the remains of an old castle taken by Wallace in 1297 from the English.

Ardwick, a town and chapelry of Lancashire, one mile from Manchester on the line to Sheffield.

Are, the legal unit of French land measure, a square of which the side is ten metres. 100 ares make a hectare, the unit in customary use (slightly under two and a half acres). [METRIC SYSTEM.]

Area, in *Geometry*, amount of surface. For the calculation of areas we have the science of mensuration. The determination of the area of a plane surface bounded by straight lines may be effected by elementary methods. In the case of areas with curved boundaries the method of quadratures in the integral calculus is generally necessary.

Areca, a genus of palms, the chief species in which, *A. Catechu*, is a native of the East Indies, where its small, pear-shaped seeds are largely

ARECA (*with fruit*).

chewed with lime and the leaves of the Betel pepper under the name of Betel-nut. It is used in medicine and in making tooth powder.

Arecibo, a seaport on the north coast of Porto Rico, West Indies. It is 45 miles from San Juan, the capital.

Arena (Lat. *sand*), that portion of the Roman amphitheatre (q.v.) in which the combats took place. It was covered with sand to absorb the blood of the victims.

Arends, LEOPOLD, born in 1817 at Wilna in Russia. He invented a system of stenography that is widely used on the Continent, and he also wrote dramas and works on natural history and music. He died in 1882.

Arenenberg, a castle in the canton of Thurgau, Switzerland, on the south-west shore of lake Constance. It was here that the Queen Hortense, daughter of Josephine, wife of Louis Bonaparte, King of Holland, and mother of Napoleon III., under the title of Duchesse de St. Leu, spent the last years of her life in retirement after her divorce from her husband and her expulsion from Paris by the Bourbons.

Arenicola, the lob-worm, a marine worm much used for bait: it lives in mud banks all round the English coasts.

Arenicolites, fossil worms supposed to have affinities with Arenicola (q.v.).

Areola, (1) the smooth area around tubercles which support the spines of Sea Urchins: (2) the areas into which insects' wings are divided by the nervures.

Areolar Tissue, a tissue composed of white and yellow fibres diffused throughout the whole body and serving as a connection between the various organs and parts of organs. It is also known as connective tissue.

Areopagitica, a work by Milton described as a "speech for the liberty of unlicensed printing." It is so called from the *Areopagitica* of Isocrates (q.v.), an appeal to the Areopagus.

Areopagus, or AREIOPAGUS (Gk. *Hill of Ares* or *Mars*), an eminence to the west of the Acropolis of Athens. Here was held the most ancient and powerful court of justice and deliberative council that existed in Greece. It was believed to have been established in 1507 B.C., or perhaps earlier. Orestes, according to Æschylus, was tried before it for the murder of his mother. Solon in 594 B.C. enlarged its jurisdiction, which extended to questions of politics, morals, and religion. It was composed of the retiring archons, who sat for life. Pericles in 458 limited its powers, which were too aristocratic for toleration in the growing democracy. Still it claimed for many years longer the veneration of the people, and, if we may believe Isocrates, exercised a paternal despotism over the lives and manners of citizens. Paul pleaded and preached before the Areopagites in 52 A.D. (Acts xvii.). It is last mentioned in history about 380 A.D.

Arequipa, a province, provincial capital, and volcano in Peru. The former extends along the coast from lat. 15° to 17° 20′ S. It produces silver, alpaca wool, sugar, wine, brandy, and chemicals. The city is the third largest in Peru. It was founded by Pizarro in 1536, and stands at the foot of Arequipa Mountain, about 30 miles inland from the port of Islay, and is connected by railway with Mollendo, the line extending across the Andes at a height of 14,600 feet to Puno and Lake Titicaca. Earthquakes have frequently devastated the place, but it has been rebuilt well and solidly, and has a university, college, public library, and cathedral. Woollen and cotton fabrics, gold and silver tissues are manufactured, and there is a considerable trade in exports and imports.

Ares, the Greek God of War, corresponding to the Roman Mars. He was the son of Zeus and Heré, cruel, and bloodthirsty in character, and not beloved either by gods or men. Thrace and Scythia were his favourite haunts, and possibly his worship was introduced thence, for he plays no conspicuous part in the legends of Hellas, nor does he anywhere seem to be mixed up with local traditions. There was a temple to him at Athens, and in Sparta, as in Scythia, it is said that human sacrifices were offered in his honour. He figures in the *Iliad* as a combatant, and was wounded by Diomed. [MARS.]

Aretæus, a Greek physician, who flourished in Cappadocia either in the first or second century, A.D. It is said that he discovered the blistering properties of cantharides. He wrote a treatise, still extant, on the causes, symptoms, and cure of chronic and acute diseases, and therein he reveals, according to competent critics, quite as much ability as Hippocrates possessed.

Arethusa, a nymph of Elis, who was unfortunate enough to excite the amorous ardour of the river-god Alphæus. Pursued by her admirer, she prayed to Artemis and was changed into a fountain. Plunging into the earth, she came up again in Ortygia, an island off Syracuse. Cicero tells us that in his day the spring was clear, abundant, and full of fish. It has been brackish since an earthquake in the 17th century—an indication that it is really supplied by a subaqueous conduit from the mainland. [ALPHÆUS.]

Aretino, PIETRO, born in 1492. He soon discovered a talent for pungent and ribald versification, and had to quit his native city, and go to Rome, where he secured the patronage of Leo X. and Clement VII., wrote some religious books, and very nearly obtained a cardinal's hat. Some obscene sonnets, written to match certain pictures by Giulio Romano, caused his expulsion from the Holy City. He next betook himself to Florence, where he remained under the protection of Giovanni de Medici till 1537. His last abode was Venice. There he died in 1557 from the effects of an uncontrollable fit of laughter. He called himself "The Divine," and his admirers styled him "The Scourge of Princes," the fact being that his talent for libel enabled him to extort blackmail from men in high position; or to act as a literary bravo for the best paymaster. He left no works that would indicate the least spontaneous wit, but his licentious vein has attracted readers and imitators.

Arezzo (classic *Arretium*), an ancient town of Tuscany, Italy, on the confluence of the Chiano and the Arno, 38 miles south-east of Florence. It was one of the wealthiest and most populous of the twelve cities of Etruria, and became a Roman colony in 30 B.C. The ruins of an amphitheatre still remain. After a long struggle it submitted to the Florentines in 1531. Many eminent men were born here; amongst them Michael Angelo, Petrarch, Guido and Vasari. It was formerly celebrated for the manufacture of Etruscan vases.

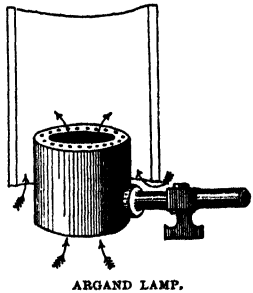
Argala, an Anglo-Indian word used as the specific name of the Adjutant, and sometimes as a popular name for that bird and the Marabou Stork.

Argali (*Ovis ammon*), called also the Ammon, a large wild sheep, ranging from Siberia to the more elevated regions of the Himalayas. An adult male has been known to stand four feet at the shoulder, and the animal has a most stately appearance from the erect carriage of the head. The horns of the male are terrible weapons, being sometimes as much as four feet long, and twenty-two inches in circumference at the base, forming a

ARGALI. (*Ovis ammon.*)

single sweep of nearly four-fifths of a circle, the points turning slightly outwards, and ending bluntly. The general colour is dark brown above, paler beneath, with a whitish disc on the rump; there is a kind of mane, white in the male, dark brown in the female, and the tail is a mere stump. In the female the horns do not exceed twenty-two inches. The white-breasted Argali (*Ovis poli*), or Marco Polo's sheep, from the Pamir Plateau, Central Asia, is a closely allied species; a pair of its horns in the Natural History Museum, South Kensington, measures fifty-six inches from tip to tip; while each horn measures sixty-four inches along the curves, and describes more than a circle and a quarter when viewed from the side. [SHEEP.] The Bighorn or Rocky Mountain Sheep (q.v.) is often called the American Argali. [AOUDAD.]

Argand Lamp, named after the inventor, a contrivance involving a special form of burner to render the incandescent surface a double one, and so increase the intensity of the emitted light. The arrangement was initially employed for oil-burning lamps, and consisted of a



ARGAND LAMP.

hollow cylindrical wick, a current of air required for the combustion of the inner surface passing up the middle. A glass cylinder was used as a chimney, to increase the draught and to steady the flame. In gas-burning lamps the burner itself is in the form of a hollow ring, the air coming up the central space as in the previous case.

Argaum, a village in Berar, India, near which, in 1803, Wellington (then General Wellesley) gained a victory over the Mahrattas.

Argelander, FRIEDRICH WILHELM AUGUST, a celebrated astronomer, born at Memel in 1799. He superintended the observatory at Abo, Finland, from 1823 to 1828, when it was burnt down, and he erected another at Helsingfors. In 1837 he was appointed professor of astronomy at Bonn, and died in 1875. He published a celestial atlas, and fixed the position of 22,000 stars. His later years were devoted to observing the varying brilliancy and magnitude of the stars, and to proving that the entire solar system is moving through space.

Argensola, the name of two Spanish writers. LUPERCIO LEONARDO, the elder brother, born in 1565, became secretary to the ex-Empress, Maria of Austria, and Historiographer Royal, produced several tragedies and lyric poems, and died in 1613. BARTOLOMEO LEONARDO, born in 1566, entered the Church. He succeeded his brother as Historiographer and died in 1631.

Argenteuil, a town 6 miles N.W. of Paris, in the department of Seine-et-Oise. In its nunnery the famous Héloise became abbess.

Argentine Republic, a State of South America which occupies the southern part of the continent excepting the western slope of the Andes Cordillera and some lands of the southernmost extremity that belong to Chili. It is bounded on the north by the republics of Bolivia, Paraguay and Brazil, and on the east by those of Brazil and Uruguay. Its sea coast is very extensive. The total area of the country amounts to over 1,700,000 square miles.

The greater part of the country is composed of a large plain, the Pampa; but there are some mountain groups that are directly connected with the great Chilian or Bolivian cordillera, or that may be considered as isolated prolongations of the great orographical system of the continent. The Tertiary formation is prevalent. Extending through all the Argentinian plain a thick layer of clay is found, called the *Pampean* formation. In certain parts this clay is mingled with lime, and this compound is known as Fosca, and is excellent for manufacturing hydraulic lime. Embedded in this formation a great quantity of interesting fossil skeletons of extinct species of mammalia have been discovered.

The rivers of the northern provinces are small: torrential in the rainy season, but quite dried up in the dry season. The great fluvial system of the Plata is very important for its extent and its ramifications; its more noted streams are the Pitcomayo (unexplored for the most part), that penetrates into the heart of the continent in Bolivia; the Bermejo, which crosses De Chaco, the Salado, the Dulce, and the Parana and Uruguay, the sources of which are in Brazil, and both of which are increased by various tributaries. The Plata, properly speaking, is only the vent or discharge of this enormous system.

The greater part of the Republic is situated in the temperate zone of the south. The northern provinces are in the tropical zone, and the soil here yields all the produce natural to it. The Chaco is a very dry, hot wilderness, of which the colonisation was comparatively recently begun: it is covered, as are the northern provinces, with large and valuable forests. The central portion, the Pampa, together with the lands on the rivers, is excellent for the breeding of every sort of cattle, and for the cultivation of cereals. The Patagonian lands of the south are dreary deserts, but according to explorers they are full of fertile oases.

The aboriginal race of the country has been greatly reduced in its numbers on account of war and of absorption into the invading European race. Not more than some thousands of representatives of the African race are to be found now in the Republic. The population is mainly formed by the Creoles, who are descendants of the Spanish conquerors, who have intermingled afterwards with the immigrants from Europe, Italians principally. They are a handsome and strong race, vivacious, progressive, and very hospitable. They assimilate quickly all modern ideas and practices, and if they are rather inclined to speculation, they are also patriotic, and jealous of the good name of their country. The population numbers about four millions. The immigration is, however, very great, and influxes of Italians and Spaniards have sometimes added a quarter of a million annually.

Buenos Aires is a fine capital with half a million inhabitants. La Plata, the capital of the province of Buenos Aires, and Rosario are other important towns, and the towns of the interior are less active, but they have advanced greatly in a very short space of time. The country has already many railway lines (in 1908, 14,738 miles) mainly constructed by British capital, and is becoming colonised with prodigious rapidity.

Solis discovered the river Plate in 1516. The first settlement, which was immediately destroyed by the savages, was made by Sebastian Cabot thirteen years afterwards. The first settlement of Buenos Aires took place in 1535; this was also destroyed by the Indians, and the second settlement of the city in its present place was made by Juan de Garay in 1580. In this first period of conquest the Spaniards founded many cities: Santiago del Estero, Tucumán, Santa Fe, Córdoba, San Juan, Salta, and others. These conquerors were military adventurers, violent and greedy, who divided the lands and the enslaved natives among themselves. The Jesuits, who had by this time arrived on the scene, founded rural colonies. Some order was established in those settlements, at first exposed to the attacks of many sea-pirates, by a governor called Góngora. At last, with the growth of a settled native population of Spanish origin, domestic practices and social virtues

arose, and these were developed by the creation of the vice-royalty of La Plata, the expulsion of the Jesuits, and the nomination of certain good men to the government of the country by King Charles III. of Spain.

During the Napoleonic wars an English military expedition suddenly appeared before Buenos Aires, landed and entered the town. The Spanish viceroy, Sobremonte, fled to the interior of the country; but the natives fought well, and the English troops had to surrender. Another English expedition, commanded by General Whitelock, was also defeated by the citizens and militia of Buenos Aires. These victories gave the Creoles an indication of their strength, and as the imbecility and abuse of the Spanish authorities were unbearable, the people of Buenos Aires, in 1810, solemnly declared their political liberty, and, after deposing the Spanish viceroy, Cisneros, constituted an independent government. Rivadavia, the first president, was a patriot and able organiser.

Later, a terrible civil war broke out, and anarchy reigned throughout the whole country, until the despot Rosas ruthlessly crushed it. After twenty-three years of unlimited power, he was defeated in the battle of Caseros by Urquiza (1852).

With the fall of Rosas the old strife between the provinces was kindled again, but in the battle of Pavon, won by General Mitre (1861), the factions were destroyed. General Mitre was then elected President of the Republic, which was reconstructed on firm foundations by his wise and honest policy. During Mitre's administration a successful war was carried on by the allied forces of the Argentine and Uruguayan republics and the Brazilian empire, against the tyrant Lopes, of Paraguay.

Sarmienti, who followed Mitre in the presidency, was an energetic statesman, but was the first who introduced the practice of naming his successor, a practice which corrupted the political body. After Sarmienti, Avellaneda was named president, and after them came General Roca. Juarez Celman succeeded, but was overthrown in June, 1890, by a revolution which delivered the country from a shameful *régime* of nepotism and public plunder.

General Julian Roca was president from 1898 until 1904. Quintana succeeded in office, and on his death in 1906 Dr. José Alcorta assumed the presidency.

There have been several boundary disputes with neighbouring republics, one of the most long-standing being that with Chile, which was settled by the late Edward VII., as arbitrator, in 1902.

Argentite (Ag_2S), or SILVER GLANCE, silver sulphide, is one of the commonest ores of the metal. It is of a blackish lead-grey, and generally massive, though occurring in cubes and in dendritic forms. It is metallic, soft, sectile, soluble in dilute nitric acid and readily fusible, and has a specific gravity of 7·2 to 7·3.

Argillaceous, from the Latin *argilla*, clay, is a term descriptive of those rocks, clays, slates, loams, marls, or sandstones, which contain any considerable percentage of clay.

Argiro-Kestro, or ARGYRO-CASTRON (Turk. *Ergeri*), a town in the province of Avlona, Albania, on the left bank of the river Vajutza. It was, until 1814, when depopulated by the plague, a place of some importance. A particular kind of fine snuff is made here.

Argol, the commercial name for the crude tartrate of potash deposited in wine casks.

Argolis, a region occupying a peninsula on the east coast of the Greek Peloponnesus, and including the states of Argos, Troezen, Epidaurus, and Hermione, with the towns also of Mycenæ, Tiryns, and Nauplia. Inachus, the legendary son of Oceanus and Tethys, is the first ruler of this district that we hear of. Danaus coming from Egypt seized the throne, which subsequently passed to Acrisius, whose grandson, Perseus, founded Mycenæ. The Heracleids, banished from Argolis by Eurystheus, the occupant of the throne of Perseus, went to Athens. Atreus, son of Pelops, coming from Elis, succeeded Eurystheus at Mycenæ, and founded the Pelopid dynasty, which held sway till 1190 B.C., when the Heracleids were restored by the help of the Dorians. In 820, after the death of Eratus, the monarchy came to an end, and an oligarchy took its place. The power of Argos declined as that of Sparta rose, and early in the fifth century B.C. the country was more or less subject to Lacedæmon. [ARGOS.] In 233 B.C. Argolis joined the Achæan League, and a century later was conquered by the Romans. It passed from the Greek emperors to the Turks, and only recovered independence in 1825.

Argonauta, the paper Nautilus, the only living two-gilled Cephalopod (q.v.) provided with an external shell; this is present only in the female, and is secreted by two of the arms. It lives in the Chinese seas, and is extinct in the Mediterranean It was once fabled to use its arms as sails. It is the type of the Argonautidæ.

Argonauts, THE (from their ship *Argo*), in Grecian mythology, a band of heroes who under the leadership of Jason sailed to Colchis to fetch a golden fleece which was guarded by a dragon which never slept. With the assistance of Medea, daughter of Aeëtes, the King of Colchis, Jason succeeded in obtaining the prize, for which he had to undergo many perilous adventures. In all of these he triumphed through Medea's aid, and finally escaped, taking her with him as his bride. For the further adventures of Jason and Medea see those headings.

Argos, the chief town of the state that gave its name to Argolis, and to the Greeks generally, and was for many years supreme in the Peloponnesus, still exists on the river Nacho (Inachus), about five miles from Nauplia. From the earliest historical period Argos appears struggling vainly against Sparta for the headship of Greece. Prostrated by a disastrous war with its rival in 496–5 B.C., it played no part in resisting Xerxes. In 461 it entered into an alliance with Athens, and in 416 the democracy asserted itself, and formed a league with Athens, Corinth, and Thebes against Sparta. Internal party struggles raged for some years, though after the Peace of Antalcidas Sparta exercised but

little influence over the Peloponnesus. From this date the history of Argos merges into that of Argolis.

Arguelles, AUGUSTINE, a Spanish politician, born in 1776. He took an active part as a Liberal in the rising against the French in 1809, and drew up the Constitution of 1812. Ferdinand, on his restoration, sent this patriot to the galleys. The revolution of 1820 set him at liberty, and made him minister and president of the Cortes. In 1823 he had to fly from Spain, but returned in 1834, and was guardian to Queen Isabella until she attained her majority in 1843. He died the next year. The probity, capacity, moderation, and eloquence of Arguelles won him high esteem and the exaggerated epithet of "divino."

Argument, in *Logic*, an expression in which something is deduced from something else which is laid down or granted. The term is frequently used to signify the theme of a discussion or narrative, but more generally of the discussion itself. Various arguments have their distinctive names, such as *argumentum ad hominem* [AD HOMINEM], *ad baculinum* (in which recourse is had to physical force), etc.

Argus, the hundred-eyed monster of classical mythology, set by jealous Heré (Juno) to watch over Io even after her transformation into a cow. Hermes (Mercury), at the instigation of the amorous Zeus (Jupiter), killed this creature, and earned the title of Argeiphontes. Heré transferred his hundred eyes to the peacock's tail. His name has become a synonym for restless vigilance.

Argus Pheasant (*Argus giganteus*), a beautiful Oriental game-bird belonging to that division of the pheasant family which contains the peafowl and other birds with elongated tails and ocelli (or eye-like markings) on the plumage. The bill is straight, except at the extremity, where it is curved; nostrils in the middle of the upper mandible; head, cheeks, and neck nearly naked; legs long, slender, and without spurs; tail of twelve feathers, in the male the two middle ones are enormously developed and the secondary quills are much longer than the primaries. The plumage is of various shades of brown, and the beautifully marked secondaries and the display of the male bird before the hen are thus described by Darwin (*Descent of Man*, chap. xiii.): "Each [feather] is ornamented with a row of from twenty to twenty-three ocelli, above an inch in diameter. These feathers are also elegantly marked with oblique stripes and rows of spots of a dark colour like those on the skin of a tiger and leopard combined. These beautiful ornaments are hidden until the male shows himself off before the female. He then erects his tail and expands his wing-feathers into a great, almost upright circular fan or shield, which is carried in front of the body. The neck and head are held on one side, so that they are concealed by the fan; but the bird, in order to see the female, before whom he is displaying himself, sometimes pushes his head between two of the long wing-feathers." It is probable that the male can also peep at the female on one side, beyond the margin of the fan. Darwin considered these marvellous markings, which he calls "ball-and-socket ornaments," and from which the genus is named ARGUS, to have been developed by sexual selection. But beauty has been gained at the expense of usefulness, for the extraordinary development of the secondary feathers has almost deprived the bird of the power of flight. The Argus pheasant is a native of Sumatra and Malacca, and is said to range into China. There is another species, Gray's Argus (*A. grayi*), of which little is known, confined to Borneo.

ARGUS PHEASANT.
(*A. giganteus.*)

Argyle, or ARGYLL, the name of a large county on the west coast of Scotland, comprising a considerable tract of the mainland, together with a number of the Hebrides or Western Isles. The total area is 3,255 square miles. The long indented coast-line affords great facilities for fishing, and many inhabitants live by this industry. Much of the surface is occupied by mountains and moorland, which provide picturesque scenery and abundant sport. The loftiest summits are Ben Cruachan (3,689 ft.), Ben More (3,172 ft.), Ben Ima (3,318 ft.), and Buchael Etive (3,345 ft.). The fresh-water lakes, of which Loch Awe is the largest, cover 25,000 acres. The rivers are small, the chief being the Orchy and the Aire. Among the islands included in the county are Iona, Staffa, Mull, Islay, Jura, Colonsay, Lismore, Tiree, Coll, Gigha, Mack, Rum, and Canna. Inverary, the capital, is on Loch Fyne, and other important towns are Campbeltown, Dunoon, Tobermory, and Oban. The rearing of cattle and sheep and the distilling of whisky are the most profitable of the local industries. Agriculture succeeds in the south, but there are no valuable manufactures. Gaelic is still the language of the native population in the north and in the islands. Argyleshire returns one member to Parliament. Pop. (1901), 73,665.

Argyll, the EARLS, MARQUISES, and DUKES OF, have belonged to the Campbell family or clan, which first came into prominence in the twelfth century, and has since produced several distinguished public characters. The first patent of their nobility in Scotland dates from 1445, and the earldom was created in 1453.

1. ARCHIBALD CAMPBELL, 8th Earl and 1st Marquis (1641), was born in 1598. He was a zealous Covenanter, took up arms against Charles I., commanded the force sent against Montrose in 1644, but was unsuccessful. Though unwilling to aid in restoring the royal cause, he seems to have taken no part in handing over the king's person to

Parliament, and the execution of Charles disgusted him and his party. In 1651 he crowned Charles II. at Scone, but the defeats that ensued shook his somewhat wavering loyalty, and he submitted sullenly to Cromwell. He sat in Richard Cromwell's Parliament, and intrigued for the return of the Stuarts. However, no sooner was Charles II. restored than he threw Argyll, whom he always hated, into the Tower. After a trial before the Scottish Parliament, in which all forms and principles of law and justice were set at naught, the aged peer was condemned. He met his death firmly and nobly on May 27, 1661.

2. ARCHIBALD CAMPBELL, his son, 9th Earl, fought as Lord Lorne for Charles II. until long after all hope was extinguished. He surrendered to Monk in 1657, and was imprisoned until the Restoration. Charles then gave him back his estates and his earldom, and saved his life when treasonable charges were brought against him. For twenty years Argyll gave support to the Government, and even connived at the oppression of the Covenanters. In 1681, however, he refused to subscribe to the Duke of York's celebrated test of passive obedience, and was condemned to death. He escaped to Holland. In 1685 he attempted a descent on the coast of Scotland in combination with Monmouth's rising. He was captured, taken to Edinburgh, and executed (June 30, 1685) on the strength of his former sentence.

3. JOHN CAMPBELL, 2nd Duke, and also Duke of Greenwich, grandson of the above, born 1678, succeeded 1703. He was created an English peer in 1705 for having promoted the Union, and in 1710 was made K.G. He served with great distinction under Marlborough in all the battles in Flanders, and was appointed Commander-in-Chief in Spain 1710, but, disappointed at the treachery of the ministry, he returned, denounced their conduct in Parliament, and was deprived of office. In 1714 he upset Bolingbroke's scheme for bringing back the Stuarts on the death of Anne, and next year he defeated Mar at Sheriffmuir. His clemency to the Jacobites gave offence, and he was again driven out of place, to be restored in 1719 as Steward of the Household and Duke of Greenwich. During Walpole's ministry he virtually governed Scotland, and did so with wisdom and moderation, dying in 1743.

4. GEORGE JOHN DOUGLAS CAMPBELL, 8th Duke of Argyll, was born in 1824. As Marquis of Lorne he took an active interest in the discussion that led to the severance of the Free Kirk from the Presbyterian Church of Scotland, but though he favoured the abolition of lay patronage, and sympathised in many ways with the movement, he declined to follow Dr. Chalmers and abandon the establishment. Succeeding to the dukedom in 1847, he published next year *Presbytery Examined*. In politics he was a Whig, and in 1851 took office as Lord Privy Seal under the Earl of Aberdeen, continuing in office under Lord Palmerston, but becoming in 1856 Postmaster-General. He again served in 1859 under Palmerston, and from 1868 to 1874 sat in Mr. Gladstone's Cabinet as Secretary of State for India. In 1875 he warmly supported the Conservative scheme for transferring patronage in the Scotch Church to congregations, and two years later he wrote a paper for the Cobden Club on the relations of landlord and tenant. In 1880 he was once more entrusted with the Privy Seal, but resigned owing to his objection to the Irish Land Bill. He afterwards published one or two papers on the land question especially directed against Mr. George's theories. Having always felt a strong interest in the progress of Darwin's views and the growth of Agnosticism, he had, in 1866, written *The Reign of Law*, an able vindication of Theism. This he followed up in 1884 with *The Unity of Nature*, conceived in the same spirit; and a smaller work, *Primeval Man*, was devoted to an examination of recent hypotheses as to the origin of the human race. He also pronounced himself strongly against Irish Home Rule, and showed an increasing sympathy with Conservatism. He married in 1844 a daughter of the Duke of Sutherland. She died in 1878, and he contracted a second marriage in 1881 with a daughter of Dr. Claughton, Bishop of St. Albans. He died in 1900.

Argyria, the condition produced by the prolonged administration of nitrate of silver as a medicine. The skin acquires a leaden hue, which is very characteristic, and the silver becomes deposited in all the tissues.

Argyronetidæ, the family of spiders which includes the common water spider, *Argyroneta aquatica*.

Argyropulos, JOHN, one of the leaders in the revival of Greek learning, was born at Constantinople early in the fifteenth century, and came to Italy in 1434. There under the protection of the Medici he taught Greek and philosophy, translating some of Aristotle's works. He died at Rome in 1489.

Ariadne, in Greek mythology, was the daughter of Minos and Pasiphaë. When Theseus came to Crete to destroy the Minotaur, she fell in love with the hero and gave him the clue of wool that guided him safely out of the labyrinth. She accompanied him to Naxos, where he abandoned her. Dionysus (Bacchus) took pity on her, married her, and after death changed her into a constellation. Her adventures have been the theme of many poets and painters. It is probable that her story typifies the return of Spring.

Ariano (classic *Equotuticus?*) a town in the province of Avellino, Italy, 38 miles N.E. of Naples. It stands on a hill 2,500 feet high, is the see of a bishop, and does some trade in wine and butter.

Arica, a seaport in the south of Peru, conveniently situated as an outlet for the trade of Bolivia. Its exports are copper ore, wool, silver, nitrate, etc. A railway connects the town with Tacca. The climate is unhealthy and earthquakes are frequent.

Ariège, L', a department of France on the Spanish frontier. It derives its name from a tributary of the Garonne in which a little gold has been found. The area is 1,890 square miles. Mountains,

forests, and lakes abound, and the mineral products include iron, marble, and alabaster. Foix is the chief town.

Ariel, in Shakespeare's *Tempest*, one of the spirits of the air, where, liberated from the tyranny of Sycorax and Caliban, he gratefully and loyally serves Prospero for sixteen years as a benign supernatural agency. Pope in *The Rape of the Lock* makes use of the same conception. Milton (*Paradise Lost*, vi. 371) introduces us to a fallen angel of this name. Isaiah (xxix. 1–7) used the word in speaking of Jerusalem, and in this sense it has been explained to mean either "lion of God" or "hearth of God."

Aries, the Ram, the first of the signs of the Zodiac (q.v.). The first point of Aries is that spot where the sun appears to stand at the vernal equinox. The constellation of Aries is, owing to the precession of the equinoxes, no longer within the limits of the sign Aries.

Aril, a fleshy outgrowth from the surface of a seed produced after fertilisation, and often red or otherwise coloured so as to attract birds. Mace is an aril round the seed of the nutmeg.

Arinos, a river of Brazil, South America, which rises in the Sierra Diamantino, and flowing N.W. joins the Jurusua or Tapajos, a tributary of the Amazon.

Arion, the "land sole," a well known genus of slugs.

Arion, a legendary musician of Greece, supposed to have been born at Methymna in Lesbos some time in the seventh century B.C. He invented the dithyrambic metre. On his voyage from Italy the crew of the vessel conspired to rob and kill him, but granted him leave to play once more before he died. At the end of his performance he jumped overboard, and was picked up and carried to Tænarus by an admiring dolphin. The lute and the dolphin were placed among the constellations.

Ariosto, LUDOVICO, the illustrious Italian poet, born at Reggio in Lombardy in 1474, his father being governor of that place. The family migrated to Ferrara, and the poet received some scanty patronage from Cardinal D'Este and Alfonso Duke of Ferrara, and was occasionally employed in diplomatic and other business, but his life was spent almost in poverty. His grand work, the *Orlando Furioso*, was published in its first shape in 1515–16, and was the result of ten years' labour. The plot professes to give the story of the madness of one of Charlemagne's paladins—Roland or Orlando—who, at the time that his liege lord was defeating Agramant the Moor, beneath the walls of Paris, fell in love with the fair but heathen princess of Cathay, Angelica, and was driven out of his senses by her marriage with Medoro. His wits were not absolutely lost, but merely shut up for three months in the moon. Astolpho visited that satellite in Elijah's chariot, and received from St. John the missing portion of Orlando's intellect securely stored in an urn. Orlando was then bound hand and foot, and, the urn being opened under his nose, his reason returned to its seat. The happier loves of Roger and Bradamante supply another long episode, and several minor actions are deftly interwoven with the main fabric of the poem. In felicity of language and perfect mastery of the octosyllabic metre, Ariosto is superior to Tasso. He did not complete his work until 1532, but in the meantime he composed several dramatic pieces, sonnets, canzonets, and Latin lyrics. His death occurred in 1533, and a monument was raised to his memory at Ferrara, in the new church of St. Benedetto, whither his body was removed forty years later. Titian preserved the poet's form and features in a remarkable portrait.

Ariovistus, the chief of the Suevi (Swabians), entered Gaul at the invitation of the Sequani about 63 B.C. to help that tribe against the Ædui, whom he defeated. He was so well pleased with the country that he settled down and began to become troublesome to his allies. Julius Cæsar came to their rescue, overthrew Ariovistus at Vesontio (Besançon) B.C. 58, and drove him back across the Rhine.

Aristæus, son of Apollo and the water-nymph Cyrene, and father of Actæon. He received divine honours for teaching men how to tend cattle and keep bees. On the death of his son he is said to have wandered over many lands and to have been initiated by Bacchus into his mysteries in Thrace. Virgil (*Georgics*, bk. iv.) gives a long account of the strange process, learnt by him from Proteus, for producing bees by spontaneous generation.

Aristarchus, (1) of Samos, a Greek astronomer, who flourished about 280 B.C. He is credited with having suspected that the earth turned on its axis and revolved round the sun. A short treatise of his on the size and distance of the sun and moon is extant.

(2) Of Samothrace, the famous Homeric critic, whose edition of the *Iliad* and *Odyssey* has been the basis of all other editions, was born about 158 B.C. He went to Alexandria as a youth, and acted as tutor to the sons of Ptolemæus Philometor. His revision of Homer has been charged with undue severity, and it is said that he arbitrarily altered and struck out many verses. On this point it is difficult to form an opinion. Aristarchus exercised his faculties upon the works of Pindar, Aratus, Archilochus, and other poets. It is said that he went to Rome, and that he died in Cyprus about 88 B.C.

Aristides, surnamed "The Just," one of the noblest figures in Greek history, was born of aristocratic Athenian parentage, probably about 560 B.C. He supported the aristocratic party and was therefore politically opposed to Themistocles. At Marathon (490 B.C.) both these rivals fought side by side at the head of their respective tribes, and according to Plutarch it was by the advice of Aristides that the sole command was given to Miltiades. Being appointed archon in the following year he showed such integrity as to win his celebrated title. When the tide of democracy set in Aristides was relegated to honourable exile by the

process of ostracism, and it is told how one citizen voted for his removal simply through weariness of hearing him called "the Just." He returned before the battle of Salamis (480), and showed his generous spirit by passing at night through the Persian fleet to hold a council of war with his rival. At Platæa (479) he commanded the Athenian contingent, and was chosen to conduct subsequent operations against Persia and to manage the joint fund of the Greek states. These duties he discharged so admirably that not a murmur of complaint was raised against him. When he died in 468 he received a public funeral, and a grant was made to his children, whom he left in poverty.

Aristippus, the founder of the Cyrenaic school of Greek philosophy, was born at Cyrene about 424 B.C. He came to Athens and was a disciple of Socrates, but he wrought out for himself a moral system widely different from that of his master. According to him pleasure is the supreme good and the end of all action. His doctrine has been styled Hedonism, from the Greek *hēdonē*, pleasure. Nor did he leave it a matter of doubt whether he meant bodily or intellectual enjoyment to be the source of happiness, for he betook himself to the luxurious court of Dionysius of Syracuse and practised what he preached. It is but fair to add that his opinions are a matter of tradition, for he wrote nothing, and left to his daughter, Arete, and his grandson, Aristippus the Younger, the elucidation of his principles. He is believed to have died in 356 B.C.

Aristobulus. Several personages bearing this name played their parts in later Jewish history.

1. ARISTOBULUS I., known as Philhellen, succeeded his father, John Hyrcanus, as high priest in 105 B.C., and having thrown into prison his mother, who assumed the duties of government, took the title of king. He marched against the Itureans, and forced them to judaise. He died after an oppressive reign of twelve months.

2. ARISTOBULUS II., second son of Alexander Jannæus, who deposed his brother Hyrcanus, the high priest (70 B.C.), and raised himself to the throne. Attacked by the Arabs, he invoked the aid of the Romans, and endeavoured to obtain recognition of his title, but having provoked Pompey he was besieged in Jerusalem, taken to Rome in triumph, and detained there for eight years. He then escaped and took up arms once more, only to be defeated and sent back to Rome in fetters. Some seven years later Julius Cæsar released him with the idea of employing him against the Pompeians in Syria, but he was poisoned by that party before he could make a start.

3. ARISTOBULUS III., grandson of Hyrcanus II. and brother of Mariamne, Herod's wife, was, through the influence of his mother and his sister with Antony and Cleopatra, made high priest at the age of seventeen. Herod, though forced to consent to the appointment, resolved to be revenged. He visited his mother-in-law near Jericho, where Aristobulus was staying, and, taking him to bathe, had him drowned in the Jordan, B.C. 34. Thus ended the Asmonean dynasty.

Aristocracy (*government by the best*), a form of government in which the power was in the hands of the most wealthy or most nobly-born; the term is also frequently applied to the nobles themselves.

Aristolochia, a genus of woody climbers, giving their name to an order, with cordate leaves and large hooded or trumpet-like flowers often brown or dingy in colour and carrion-scented, chiefly natives of the tropics. They are bitter and stimulant, and are almost universally held to be antidotes to snake-bite.

Aristophanes, the great comic dramatist of Athens, was born about 444 B.C. His opponents maintained that he was not by birth an Athenian citizen, but probably without good reason. It is rumoured that he studied under the Sophist Prodicus, but this is doubtful. He certainly attached himself to the old aristocratic and conservative party, and his talents were employed in satirising the democratic influences that he conceived to be undermining the Athenian constitution and character. Not that Aristophanes limited his sarcasm to the field of politics; the religious and judicial systems, the education imparted by Sophists, the tragic drama, the habits of the men and women of the day, all provided marks for the shafts of his keen wit. Reckless humour, often degenerating into wild buffoonery and utter coarseness, gives the key-note to his dramas, but his play of fancy is marvellous. He occasionally utters wise and noble sentiments, and his Attic style found an admirer in so strict a judge as Plato. Whether he aimed honestly at social and political reform is a matter of doubt. The persons who incurred the severest chastisement at his hands were Socrates in *The Clouds*, Euripides in the *Achanians*, *The Frogs*, and *The Thesmophoriazusæ*, and Cleon in *The Knights*. His first play appeared in 427 B.C., and he is said to have written fifty-four in all, eleven of which have come down to us. He died in 380, eight years after a law had been passed to check the licence of the stage in presenting real characters for public derision.

Aristotle, the founder of that Peripatetic School of Philosophy in Greece which has had so wide an influence over human thought, was born in 384 B.C. at Stagira, Macedonia. Hence he is called "The Stagirite." His father was physician to the Macedonian court, but died when Aristotle was seventeen. Left an orphan, the youth went to Athens, and, after following for many years the teaching of Plato and other Socratic philosophers, set up a school of his own. After Plato's death (348) he spent some years in Mysia, but was invited in 343 to undertake the education of Philip's heir, the future Alexander the Great. He was handsomely treated both by father and son, and in 335 returned to Athens, where the Lyceum was assigned to him as a school. Here he taught for thirteen years, delivering his lectures as he walked up and down the shady colonnades—a habit that gave the name "Peripatetic" to his doctrine. In 332, pursued by jealous foes with charges of impiety,

and having lost Alexander, whose friendship for him had cooled even before death, Aristotle fled from Athens and took refuge at Chalcis and died there within the year. In personal appearance the great philosopher was thin and slightly built. He had small eyes, a shaven face, and a feminine voice, and always showed great care for his dress. He left a son, Nicomachus, and a daughter, Pythias, both of whom he dearly loved.

As a speculative thinker, Aristotle is distinguished for range no less than power. Though much that he wrote has been lost, we have from him profound and original treatises on Metaphysics, Psychology, Logic (the *Organon*), Physics, Natural History, Meteorology, Moral and Political Science (the *Ethics* and *Politics*), Rhetoric and Poetry. Within the limits of these pages it is impossible even to give an intelligible outline of his principles, but there is scarcely one of these works that might not serve as the basis of a great reputation. For the Natural History and Politics Alexander is reported to have employed a host of men in collecting materials and information, but the organising of this chaotic mass was a task that demanded superhuman industry and incredible genius. In 1891 a work was published which was announced to be from the pen of Aristotle, which consisted of a brief record of the rise and growth of the constitutions of Athens. But all this was but a small part of what he achieved. The principles which he laid down, the terms that he employed, the methods he pursued in Psychology, Ontology, and Logic, have not only shaped the whole tenour of the Christian theology, and provided a foundation for numberless sects and schools of philosophy, but they have so permeated the daily lives of men that it is scarcely possible to frame a sentence that is wholly unflavoured by Aristotle. If in Ethics his doctrine of "the mean" scarcely commends itself as a satisfactory explanation of the difference between right and wrong, yet his theory of the formation of habit, his conception of that happiness which is the chief good, and his description of typical characters are masterpieces, while his attempt to reduce morals and politics to the certainty of science has served as a starting point for all subsequent inquiry.

Aristotle's Lantern, the jaw apparatus of Sea Urchins, as in the common English species (*Echinus esculentus*); it is of five sectors, each of which consists of four pieces, a triangular pyramid or alveolus, perforated by a long keeled tooth. Above is a curved piece, the compass or radius, and along the upper junction of two pyramids is the rotula or brace.

Aristoxenus, a Greek philosopher and musician, born at Tarentum in Italy, about 350 B.C. Of the 453 works that he is said to have written, only one, *The Elements of Harmony*, has come down to us. Harmony, as understood by him, applied only to a succession, not to a combination of sounds, and was connected with that wider idea of symmetry which music was supposed to symbolise. He invented a scale in many respects similar to the modern diatonic scale. Perhaps the most remarkable of his views was that which he held as to the distinction of tones by the ear instead of by mathematical process as Pythagoras had proposed.

Arithmetic, the science of numbers. The systematic representation of numbers is termed notation. With a bad system of notation, such as that of the Greeks and Romans, arithmetical processes were laborious, and the progress of the science very slow. It was not till the introduction of the decimal system of notation in the tenth century that arithmetic began to develop much, though there had been writers on the subject from the time of Euclid. The elementary operations in arithmetic are addition and subtraction, converse processes that in the extension of the science in algebra are regarded as identical; and the other two converse processes, multiplication and division. The theory of numbers supplies us with different modes of operating. Thus ordinary multiplication is effected by a method of continued addition, and division by subtraction; but these may also be effected by logarithms (q.v.). The various subjects to which arithmetical rules are applied, are noticed separately.

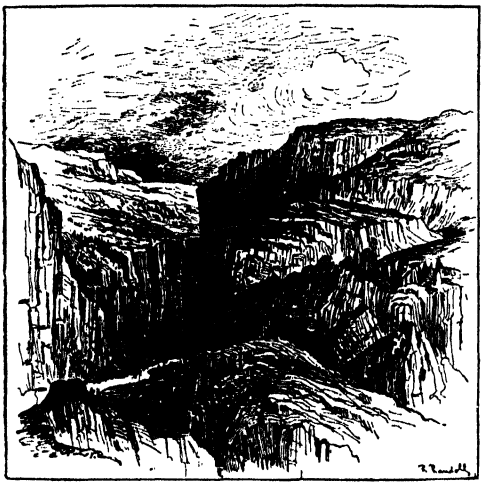
Arithmetical Mean, or AVERAGE, of two or more numbers, the n-th part of their sum, where n is the number taken. Thus the A.M. of three numbers is one-third their sum.

Arithmetical Progression, a series of numbers each one of which differs from the preceding by a constant amount. Thus 2, 5, 8, 11 . . . . or 3, $2\frac{1}{3}$, $1\frac{2}{3}$ . . . . , the differences in the two cases being 3 and $-\frac{2}{3}$ respectively. The sum of such a series is the average term (the mean of first and last) multiplied by the number of terms.

Arius, the founder of Arianism, was of African descent. It is supposed that he was a pupil of Lucian of Antioch. In 313 he was ordained presbyter at Alexandria with the charge of a church at Baucalis. His doctrine, briefly summed up, was this—that the Son was not uncreated or unbegotten, but was called into existence by God, and admitted to a participation in the Divine nature; that the Son has a beginning, but that the Father has no beginning. He conceived this to be the original teaching of the Church, and regarded the opposite opinion as new and heretical. Alexander, Bishop of Alexandria, denounced the doctrine, though Eusebius, Bishop of Cæsarea, regarded it as consistent with orthodoxy. A fierce dissension arose and the Emperor Constantine summoned the Council of Nicæa (A.D. 325) to settle the point. Athanasius strongly opposed Arius, who was excommunicated, a new creed being drawn up to meet the difficulty. Meanwhile, the heresy gained ground, and Constantine recalling Arius, heard his explanations, and caused him to be restored by a synod at Jerusalem. Athanasius, then Bishop or Alexandria, was in exile at Trèves (A.D. 336), but Alexander, Bishop of Constantinople, refused to readmit Arius to the Church. Arius died in 336. It is thought that he was poisoned. Of his book *Thalica* we have only a few fragments preserved in the writings of Athanasius, but some of his letters are

extant, and sufficiently record his opinions. Arianism existed within the pale of the Church until the Second Council of Constantinople in 381, and was held by a distinct sect until 950.

Arizona, a territory of the United States of America, bounded north by Utah, east by New Mexico, south by Mexico, and west by California and Nevada. It comprises a tract of land ceded to the States as part of New Mexico in 1848; while the S. part was purchased from Mexico 1854: but it was not organised as a separate territory till 1863. The area is 113,916 square miles, a large proportion of the population consisting of Indians. Much of the surface is occupied by a barren plateau, 11,000 feet above the sea level, through which the Colorado river passes in a stupendous gorge, or "cañon," 300 miles long, and from 3,000 to 6,000 feet deep. South of this lies the valley of the Little Colorado



VIEW OF THE GRAND CAÑON, ARIZONA.

or Flax river, and farther south still the fertile district about the Mogallon mountains, whilst near the Mexican frontier is the basin of the Gila river with its tributaries. Gold, silver, and copper mining yield nearly a million and a half sterling per annum, yet the resources of the country are but half developed. Abundance of timber is produced, and grapes, figs, oranges, tobacco, and every variety of cereals grow well in the lower lands. Prescott in Yavapai county is the capital, Arizona city and Tucson are growing towns.

Arjish, a town in Turkish Armenia, on the north shore of Lake Van, to an arm of which as well as to a river it gives its name.

Ark, a chest, coffer, or other receptacle; specially, the term applied in the Old Testament to (1) the chest which contained the covenant or tables of the law; over it were the mercy-seat and the two cherubim; (2) the large boat or floating vessel in which Noah took refuge during the Deluge; (3) the vessel made of bulrushes in which Moses was laid when an infant.

Arkansas, one of the United States of America, deriving its name from a tribe of Indians who were the primitive occupants. It is bounded north by Missouri, east by Tennessee and Mississippi, south by Louisiana, and west by Indian territory. The district was first colonised by France in 1685, then ceded to Spain, restored presently to France, and finally in 1803 sold with Louisiana to the United States. It was organised as a territory in 1819, and erected into a state in 1836. Its area is 52,198 square miles. The Arkansas river, nearly 2,200 miles long, waters much of it, and there are also the Mississippi, Red, White, and Washita rivers. The soil in the central portion is very rich, and the surface charmingly undulating and wooded. Towards the east marshes prevail, and the western parts are mountainous. Until recently the state was devoted to agricultural and pastoral industries, producing all kinds of corn, rice, sugar, cotton, potatoes, and tobacco, and rearing numberless cattle; now the mineral wealth, consisting of silver, coal, zinc, and iron, is being rapidly developed. Little Rock is the seat of government, Arkansas, Batesville, Columbia, and Fulton being places of importance.

Arkansas River. [ARKANSAS.]

Arklow, a seaport in the county Wicklow, Ireland, on the Avoca river, close to the sea, and twelve miles from Wicklow. The railway from Dublin to Wexford passes through. The lower town is the fishermen's quarter, the inhabitants being mostly engaged in the herring and oyster fisheries. The old castle now in ruins was destroyed by Cromwell in 1649, and a sharp encounter between the United Irishmen and the British troops took place near the town in 1798.

Arkwright, SIR RICHARD, KNT., was born at Preston in 1732. He started in life as a barber, but, in conjunction with Kay, a clockmaker at Warrington, invented, about 1768, a machine for carding cotton, so as to adapt it for being dealt with by the spinning jenny of Hargreaves. The two inventions revolutionised the manufacture of cotton goods. He patented his spinning-frame in 1769, and entering into partnership with Mr. Smalley, started in business at Preston. This attempt was unsuccessful, so he moved to Nottingham, where he employed horse-power to work his machinery. A little later he combined with two capitalists, Mr. Strutt and Mr. Need, to start a mill at Cromford, near Matlock, using the water of the Derwent for motive power. Here in the course of twenty years he amassed a large fortune, though his patent was set aside by the Court of King's Bench in 1789; and here he died in 1792, after receiving the honour of knighthood, not so much for his inventive genius as for a loyal address to George III.

Arles, on the Rhône, a city in the department of Bouches du Rhône, France; about 46 miles north-west of Marseilles. Constantine was so delighted

with the spot that he built a palace there, and gave the town the name of Constantia. The ruins of the vast amphitheatre and of many other Roman works show its prosperity at that period. Under the Merovingians it became capital of Provence, and from 933 to 1032 was capital of the Burgundian kingdom of Arles. For a brief space it took the form of a Republic, but ultimately became part of Provence. Many ecclesiastical councils were held here. The cathedral of St. Trophimus has a fine portico; the Town Hall dates from Louis XIV.; and there are all the usual public institutions, with a school of navigation. A canal connects Arles with the Mediterranean, and the railway from Paris to Marseilles has a station there. There are factories for making silks, serge, railway carriages, etc., and a great trade is carried on in oil, wine, fruit, and other produce.

Arlington, HENRY BENNET, EARL OF, was born in 1618. He served for Charles I. during the Civil War, and was knighted in 1658. He shared the exile of Charles II., and was employed in Italy and Spain. Returning at the Restoration he was created a baron, and was deeply immersed in all the intrigues that followed that event. In 1670 he was the foremost member of the Cabal Ministry. In 1672 he was promoted to an earldom, received the Garter, and subsequently held the office of Lord Chamberlain. He was not a favourite of James II., nor did he take any prominent part in affairs for a few years before his death, which occurred in 1685.

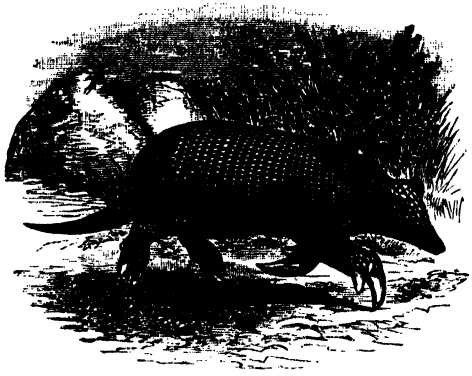
Arm, ANATOMY OF. The arm is divided into the upper arm, the fore-arm, wrist, and hand. The bone of the upper arm is called the humerus; its head or upper extremity articulates with the scapula, forming the shoulder-joint; the lower extremity of the humerus articulates with the radius and ulna, the two bones which form the framework of the fore-arm. In the neighbourhood of the wrist are the eight carpal bones, then follow the five metacarpal bones, corresponding to the four fingers and thumb; and finally the phalanges complete the series of bones of the upper extremity. To each finger there are three phalangeal bones, but the thumb has only two. Movement at the shoulder-joint is very free, and dislocation of the shoulder is, in correspondence with this fact, one of the most common forms of dislocation. The rounded prominence of the shoulder is mainly formed by the *deltoid* muscle, the action of which is to raise the arm; the anterior fold of the armpit is formed by the *pectoralis major* muscle, which draws the arm across the chest. The fore-arm is bent or flexed on the upper arm by means of the *biceps*. The elbow is a true hinge joint, only permitting of movements of flexion and extension, forming thus a marked contrast to the shoulder. The rotation of the radius upon the ulna permits of the rotation of the hand upon the fore-arm, or of pronation and supination, as it is called; the position of pronation being that in which the palm is downwards, while in supination the back of the hand faces downwards. In addition to this the hand can be flexed or extended by movement at the wrist joint. The main artery of the arm is the axillary or brachial, as it is called, after reaching the lower fold of the axilla (armpit). The brachial divides into the radial and ulnar arteries; the radial artery at the wrist lies quite superficially, and pulsation in it being so readily felt, it is the vessel always examined in observing the arterial pulse. In the days of bleeding, the vein which was commonly operated upon was the *medium basilic*, which lies just in front of the elbow. The nerves of the arm come from the spinal cord, and are grouped together, forming what is called the *brachial plexus* before they divide into special trunks. Finally, three great branches, the musculo-spinal, median and ulnar nerves are formed, as well as other smaller ones. The ulnar nerve lies just underneath the skin, behind the lower and inner process or condyle of the humerus, and pressure there causes the well-known tingling in the course of distribution of that nerve. The arm is well supplied with lymphatic vessels, which convey the lymph upwards and finally empty it into the great veins.

BONES OF THE ARM.

Armada (literally *an armed force*), the name given to the Spanish fleet sent in 1588 by Philip II. to achieve the conquest of England. It was termed by the Spaniards the "Invincible" Armada, and consisted of 130 war-vessels, with 30 smaller ships, containing nearly 20,000 marines, besides sailors and slaves. It was under the command of the Duke of Medina-Sidonia, who was to act in concert with the land force of the Prince of Parma in Flanders. The Armada was attacked by the English as it sailed up the Channel, and suffered such severe loss that it was decided to abandon the enterprise; the fleet was, however, almost entirely destroyed by storms off the Orkneys and the north coasts of Scotland and Ireland.

Armadillo (a Spanish word referring to their defensive covering), the popular name of any animal of the Edentate family Dasypodidæ, confined to tropical and temperate South America, with the exception of the Peba (q.v.), found as far north as Texas. They are burrowing animals, furnished with strong claws fitted for digging, and well-developed collar-bones. They vary greatly in size, the largest being more than three feet and the smallest about ten inches in length, from the snout to the insertion of the tail. The teeth are simple molars, in one case as many as twenty-five on each side in each jaw. These teeth are not in a continuous row, but have spaces between them so that those of the upper and lower jaw interlock when the mouth is shut. In one species only there are teeth on the pre-maxillary bone, corresponding to the incisors of higher mammals. The upper surface of the body is covered with a coat of mail of

hard bony plates or shields, united at their edges. In the most perfectly armoured there are four distinct shields—one covering the head, another the back of the neck, a third on the fore-part of the back, and the fourth covering the rump. Between the third and fourth shields, bands—from three to thirteen in number—occur. These bands are movable on each other, and allow the rest of the armour to accommodate itself to the body, so that most of the animals can roll themselves into a ball like the hedgehog, presenting no vulnerable part to an enemy. The tail may be protected by incomplete bony rings and scales, and some of the latter



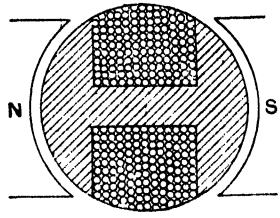
ARMADILLO (*Dasypus gigas*).

are scattered over the limbs and under surface. The head is long and broad at the neck, which is short; and the body is long, round, and low. The Armadillos are mostly nocturnal timid animals, capable of burrowing rapidly, and some of them able to run with considerable speed. They have a strong sense of smell and hearing, and feed on vegetables, fruit, insects, worms, and, in some cases, carrion. [GLYPTODON.]

Armageddon, the name given in the Apocalypse to the battlefield of the "great day of God," where the final conflict between good and evil is to be fought.

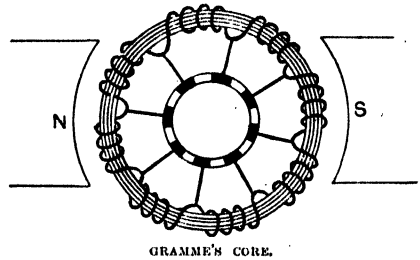
Armagh, a county and its chief town in the province of Ulster, Ireland. The county is bounded north by Lough Neagh, east by Down, west by Monaghan and Tyrone, and south by Louth. Its area is 512 square miles. The surface is diversified, being traversed by the Slieve Gullion and Newry Mountains, but half of it is good arable land, and a third is suitable for pasture. The rivers Bann, Blackwater, Callan, Tona, and their tributaries water the country well. Pop. (1901), 125,238. *Armagh*, the chief town, stands on the river Callan, 33 miles from Belfast. From the fifth to the ninth century it was the metropolis of Ireland, and remains so still in an ecclesiastical sense, being the seat of the Protestant primate. It has also a Roman Catholic bishopric. A large market is held here, at which unbleached linen is sold in great quantities. Population (1901), 7,569.

Armature, in electrical engineering, the term applied to a very important part of the modern dynamo or motor, on the construction of which the efficiency of the machine largely depends. The theory of the armature is explained in the article DYNAMO-ELECTRIC MACHINERY. It consists essentially of an arrangement of coils of wire or metallic riband so wound as to aim at producing a great



SIEMENS' CORE.

difference of potential in the circuit, when rotated at a definite rate in the magnetic field. The coils are wound on some sort of soft iron core, inasmuch as this increases the intensity of the magnetic field.



GRAMME'S CORE.

Siemens introduced in 1856 a core of H-shape, shuttle-wound; Gramme invented in 1870 a ring-shaped iron core, the wire being wound round this in a particular way. Modifications of these two are the chief forms of core used at present. To wind the wire in such a way as to give a great number of coils, and to pack them in the most intense part of the magnetic field, affords much scope to the inventor. Hence the methods of winding are very numerous.

Armenia, a district of western Asia, lying between Georgia and Mingrelia N., the mountains of Kurdistan S., the Caspian Sea E., and the river Euphrates W. Its precise extent has been variously fixed at different epochs, but the inhabitants have from time immemorial possessed distinctive racial characteristics, though within historical memory they have seldom been politically independent. We first hear of Armenia as subject to the Medes, and it followed the fate of Media until reduced to a Roman province in 106 A.D. At the disruption of the Empire, for a short period an attempt was made to set up a native dynasty, but the Seljukian Turks

seized the country in the eleventh century, and ultimately it was divided between Turkey and Persia, Russia obtaining a share later on. The Turkish portion constitutes the province of Erzeroum, the Persian that of Azerbijan, and Russia claims the government of Erivan, the limits of which have been frequently extended. The chief Turkish towns are Erzeroum, Kars, and Van. Urumiyah is the only important place in Persian Armenia, whilst Russia holds Erivan, Akhalzikh, Echmiadzin, Ordubad, and Alexandropol. Armenia occupies a plateau intersected by lofty mountains, of which Ararat is the central and highest peak. The rivers Euphrates, Tigris, Aras, and Kur rise within its borders. The climate is temperate and even severe in winter on the higher levels. In the valleys and plains the soil is fertile, producing all kinds of cereals, cotton, hemp, tobacco, and raw silk. The chief wealth of the country, however, lies in its mineral resources, hardly as yet developed. Naphtha is now exported in increasing quantities, bitumen, sulphur, nitre, and other volcanic products abound, and the mountains yield gold, silver, copper, lead, iron, and valuable marbles. The Armenians embraced Christianity at the end of the third century, and established a church which has retained its individuality to the present day, differing from other forms of Christianity in supporting hereditary priesthood, and adhering to the doctrines of Eutyches and the Monophysites. They have four patriarchs, the chief of whom has his abode at Echmiadzin, and their religion is exercised under Russian protection. Armenia is calculated to have an area of about 90,000 square miles. The Armenians suffered terrible atrocities at the hands of the Turks during 1894–1897, and their numbers were diminished. The ARMENIANS, who call themselves *Haikan*, from Haig, mythical founder of the race, are a distinct branch of the Caucasic stock, intermediate in physical type between the Aryan and Semitic divisions, but on account of their language usually classed as Aryans. They are tall and well made, though inclining to obesity, with dolichocephalic head, large black eyes deeply set in the orbits, long oval face, large aquiline nose, hair normally black, altogether with a somewhat Jewish cast of countenance. Though the bulk of the people still occupy their native land, many are scattered, like the Jews, in more or less numerous communities over a wide area extending from Great Britain to India; and like them they everywhere show the same preference for trade over other pursuits, and the same tenacious adherence to the national speech, religion, and usages. The Armenian language holds a middle position between the Iranic and Slavic branches of the Aryan stock, and probably represents an independent branch formerly diffused throughout Asia Minor and the West Iranian highlands. It is written in a peculiar character derived from the Syriac through the Pahlavi (F. Lenormant) and attributed to Mesrob, Apostle of the Armenians early in the fourth century. Since that time the language has been cultivated chiefly under Hellenic influences, and possesses numerous literary remains, especially historical and theological. The old ecclesiastical language is now represented by two modern varieties, the eastern current in Armenia and thence eastwards to India, the western spoken by the Armenian communities in Turkey, Crimea, and Europe generally. Since the sixth century the Armenian Church professes Eutychian doctrines, and forms one of the six distinct "rites;" it is administered by a regular hierarchy with numerous bishops and four patriarchs, of whom the chief resides at Erivan. Many are "Uniates," that is, recognise the supremacy of the Roman pontiff, while retaining their national liturgy. The Armenian nation numbers about 2,000,000, of whom 820,000 are in Russia, 750,000 in Turkey in Asia, 250,000 in Turkey in Europe; 150,000 in Persia; 50,000 elsewhere.

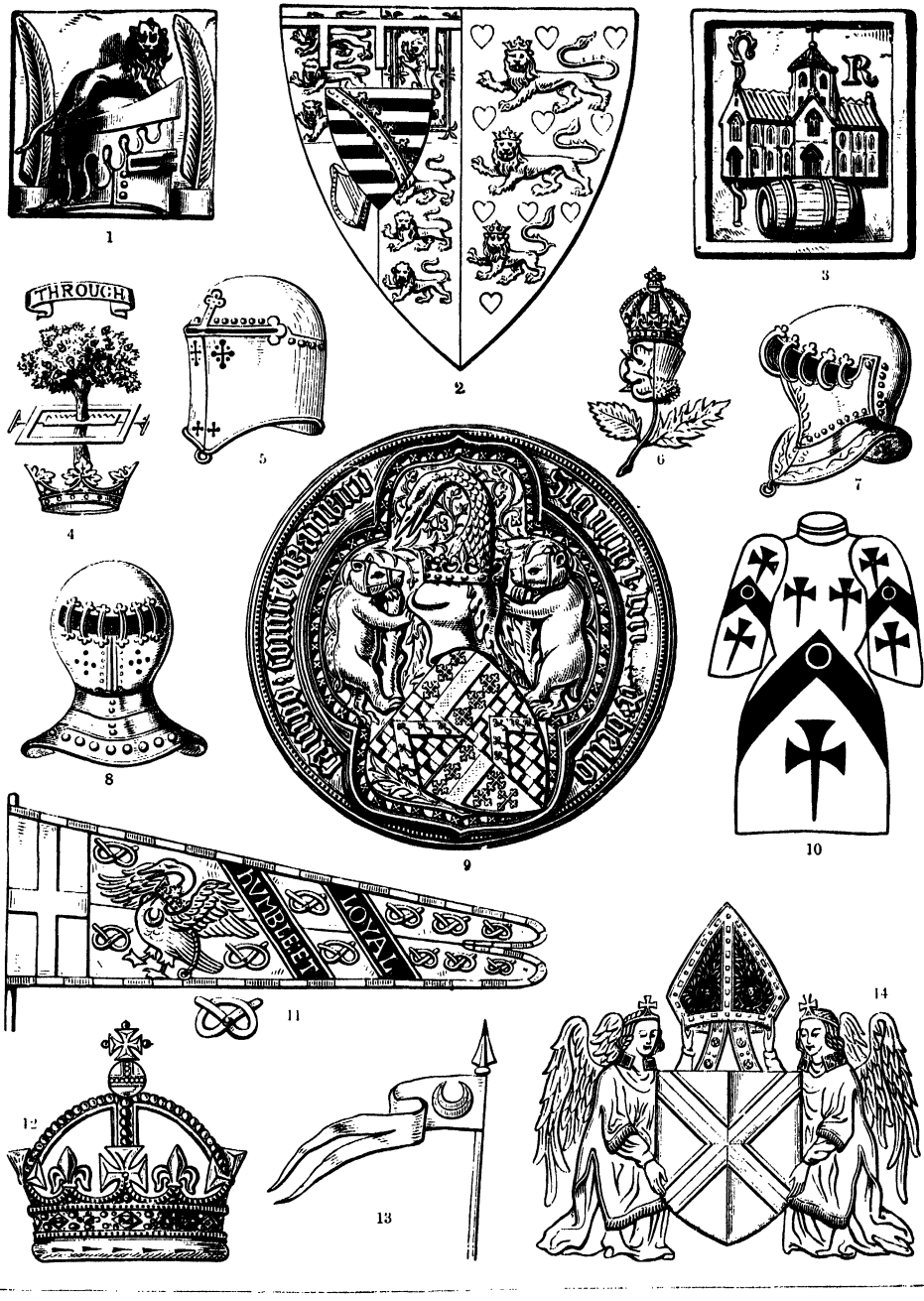
Armentières, a town in the department of the Nord, France, about nine miles N.W. of Lille on the river Lys. There are considerable manufactures of linen, cotton, sugar, spirits, etc.

Armfelt, GUSTAV MAURITZ, BARON, born in 1757, a Flemish nobleman, who was appointed by Gustavus III. of Sweden in 1788 to command one of the divisions of the army put in the field against Russia. In 1792, on the death of the king, he was made governor of Stockholm and member of the regency. Accused of conspiracy he fled to Russia, but returned in 1799, and held various posts till 1810, when he was suspected of poisoning the Prince of Augustenburg. He again found an asylum in Russia, where he was loaded with honours. He died at Tzarskoe-Selo in 1814.

Armida, a character in Tasso's *Jerusalem Delivered*. She was a lovely enchantress who bewitched Rinaldo, and made him pass his days with her in voluptuous ease. A talisman was sent by his comrades to break the spell. Armida, frantic at his departure, set fire to her palace, and rushed off to commit suicide, but Rinaldo, following, promised to save her, and endeavoured to persuade her to become a Christian.

Armillary Sphere, an astronomical instrument employed to illustrate the chief lines of reference in the celestial sphere, and to exhibit the apparent motions of the heavenly bodies as seen by an observer at the centre. It was much employed by the ancient astronomers, and Tycho Brahe used a modification thereof to make actual measurements; but the instrument is now rarely used, its place being generally supplied by the celestial globe (q.v.).

Arminius (Teut. *Hermann*), the German hero who freed his country from the Roman yoke, born about 16 B.C. He was the son of Sigimer, Chief of the Cherusci, and served in the Roman army. When Quintilius Varus, the legate in Germany, had stirred up the hatred of the tribes by his oppression, Arminius took the lead in a desperate conspiracy. He persuaded Varus, in A.D. 9, to march against the insurgents into the country between the Weser and the Ems, but harassed him on the way until his forces were exhausted. Then falling upon the legions in a defile between Wiedenbruck and Detmold, he slaughtered



ARMORIAL BEARINGS.

1 Helm, Crest, Mantling, and Badge of Richard II. 2 Impaled Shield of Prince and Princess of Wales. 3 Rebus of Abbot Kirton. 4 Crest of Hamilton. 5 Esquire's Helm. 6 Badge of James I. 7 Noble's Helm. 8 Sovereign's Helm. 9 Seal of Sir Richard de Beauchamp, K.G., Fifth Earl of Warwick: died A.D. 1439. 10 Tabard. 11 Standard of Sir Henry de Stafford, K.G.; about A.D. 1475. 12 Crown of Queen Victoria. 13 Pennon of Percy: A.D. 1400. 14 Shield of St. Alban's Abbey (partly restored).

them to a man. Germanicus was sent to punish him, but failed in his mission. Arminius was killed in 21 A.D. by his own kinfolk during some tribal dispute. A colossal statue of him was set up near Detmold in 1875.

Arminius, JACOBUS (Germ. *Hermannsen*), the founder of the Arminian school or sect, was born at Yssel, Holland, in 1560. He studied at Utrecht, Marburg, Leyden, and Geneva, having at the latter place the rigid Calvinist, Theodore Beza, for his instructor. He returned to Holland with a high reputation for learning, and was appointed in 1588 one of the city preachers at Amsterdam. Calvinists were then divided by the disputes between Supralapsarians, or strict Calvinists, who believed that the scheme of redemption and election was ordained from the Creation, and Sublapsarians or Remonstrants, who held that it only came into existence after Adam's fall. Arminius was engaged to refute this latter view, but was gradually converted to it. In 1603 he was appointed Professor of Theology at Leyden, and his orthodoxy was at once called into question by one of his colleagues, Gomar. The controversy agitated the whole Church, and was still raging when Arminius died in 1609. The Synod of Dort in 1619 condemned the doctrine of the Remonstrants as savouring of Pelagianism and tending towards Romanism. Two hundred clergy left the Dutch Calvinistic Church in consequence of this decision.

Armistice, a cessation of hostilities for a stipulated time by agreement between the two belligerent parties, which differs from a *peace* in that the latter implies no intention of further hostilities, while an *armistice* indicates an intended continuation of warfare.

Armitage, EDWARD, R.A., an English painter of frescoes and historical subjects, born in 1817. He was a pupil of Paul Delaroche. In 1842 he exhibited in the Salon his first picture—*Prometheus Bound.* In 1843-45-47 he took prizes for cartoons at Westminster Hall. After a sojourn in Rome he went to the seat of war in the Crimea and produced *The Heavy Cavalry Charge at Balaklava,* and *The Stand of the Guards at Inkermann.* In 1867 he was elected A.R.A., and in 1872 R.A. He was appointed professor and lecturer on painting to the Royal Academy in 1875. He died in 1896.

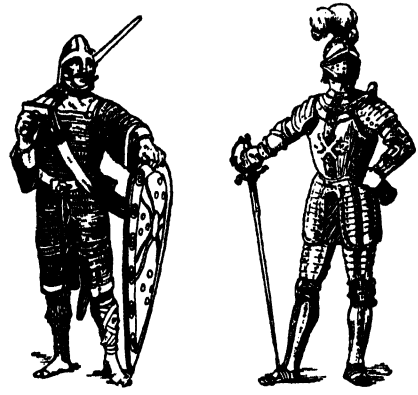
Armorial Bearings. Though strictly speaking this is a far more correct and a more comprehensive term, it is frequently used to denote what is popularly understood by the word *arms,* or by *coat-of-arms.* The greater or less antiquity of armorial bearings has occasioned much dispute, but it would be safe to say that the actually primeval state and origin of heraldic insignia is to be found in the *totemism* of half-civilised tribes. The badges of the Scottish clans still existing, and the family badges which prior to the reign of Elizabeth were of such very common usage in England, point more clearly to this than do the armorial bearings of the present day, which are supposed to be the outward and visible sign of the gentility of the bearer, either by birth or patent. Æschylus in his poems affords us evidence that even in his day the shields of the warriors bore emblematical designs or devices, and Virgil likewise. On the other hand it is held that such designs, and those upon the banners, were either meaningless ornament and decoration, or only regulated by the fancy of the artist or the requirements of the shape of the shield. And though they may have been used for the purposes of identification and distinction, certain is it that they had but small resemblance to and but little in common with the earliest examples of coats-of-arms as we now understand them. The various arms ascribed to the different Saxon kings and to the earlier Welsh princes, upon which argument is often based, there can be but little doubt are the inventions of a later date; and the late J. R. Planché, Esq., Somerset Herald, maintained, and his theory is very generally accepted, that there is no contemporary or reliable evidence of properly heraldic armorial bearings prior to the twelfth century, during which, however, they became hereditary, and their use very general. At first mention is only made of *devises* or *cognoissances,* but as their most frequent use was upon the standards and shields of the warriors, these devices were soon termed *arms,* and from being embroidered upon the surcoat of silk worn over the hauberk or coat of mail, the designation of coat-of-arms, by which they are now known, is derived. The armorial bearings of a commoner at the present day consist of the *escutcheon* and the *charge* upon it, which together constitute the *coat-of-arms* proper; this is surmounted by the helmet, and pendent from this last is the *Lambrequin.* A few very old families possess no crest, but in the large majority of cases either a *coronet,* a *chapeau,* or a *wreath* (usually this last, another name for which is the *torse*) is placed upon the lambrequin, and on this is the *crest.* Crests were of later adoption than coats-of-arms, and mottoes are comparatively a recent innovation. These, unlike the arms and crest, which are most strictly hereditary, can be assumed and changed at will. Though it is a form of emblazoning rather falling into disuse, the whole may be displayed upon a mantle, which, with the helmet, will vary according to the rank of the bearer. Some baronets and a few others have been granted the right to bear *supporters.* These are the figures placed one on either side of and outside the escutcheon, and are otherwise one of the distinguishing marks of a peer, who also carries the coronet of his degree. Knights, other than knights bachelors, encircle their shield with the motto and the collar, and pendent from this the badge of the order to which they belong. Women are not allowed to make use of a crest or of a motto, and may only bear the arms to which they are entitled upon a *lozenge,* though a peeress will surmount this by her coronet, and will use supporters. The colours of the livery and of the carriages of a family should be regulated by their coat-of-arms, though this rule is too often disregarded. Owing to the advertisements of bogus heraldic offices, of late years armorial bearings have been largely assumed most unwarrantably, and thereby brought

into some disrepute: and no one has any right whatsoever to assume or in any manner display such insignia, unless clear male descent has been proved from some person who has received a grant of arms, or to whom arms have been allowed and recorded by the Heralds College (otherwise known as the College of Arms) in England, the Lyon Office in Scotland, or the Ulster Office in Ireland, the officials of which are the only authorities whatsoever upon such matters. Everyone using armorial bearings in England and Scotland (Ireland is exempt) is required to pay an annual licence of one guinea, or of double that amount if the said armorial bearings are painted upon or in any way affixed to a carriage.

Armour, garments of various materials, used to protect the body against missiles or cutting and stabbing weapons. There is no trace of armour among the early stone-using peoples, though it is probable that the value of hides or skins was early recognised as being difficult to pierce. Worsaae suggests that the first helmets were simply the head skins of beasts mounted on a wooden framework; and the term "cuirass," probably derived from the word *cuir*, points to the use of leather for body armour. In Assyrian sculptures the helmet is pointed and seems formed of metal, the body alone being covered by a close jacket of twisted cords or possibly metal mail. The Greeks of the Homeric age wore crested helmets, and greaves made of a "pewter-like metal" guarded the leg, the body being protected by a shield covering it from neck to ankle. When cuirasses were introduced is doubtful, but they appear later on, when the whole of the

GREEK AND ROMAN ARMOUR.

armour was of bronze; and the shield had decreased in size. The thighs were covered with strips of leather in one or more layers pendent from the edge of the cuirass, which was sometimes moulded to the shape of the body. The Persians and many other Asiatics used tunics of quilted linen, as the Chinese until recently employed dresses of quilted cotton most difficult to penetrate; and in many cases on these were sewn metal scales overlapping each other. The armour of the Roman soldier consisted of back and breast pieces of laminated metal, supported over the shoulders by metal straps; but those of higher rank wore a cuirass similar to the Greek and much ornamented. Both forms left the arms and legs bare, the tunic covering the former and hanging below the leather strips pendent from the cuirass, which protected the lower part of the body and thighs. The legs



ANGLO-SAXON AND MIDDLE-AGES ARMOUR.

were undefended. The scale armour, "lorica squamata," originally of leather only, had eventually scales of steel, or even metal chains, sewn on the leather tunic. The "Velites," or light troops, wore only the quilted coat. The helmet was less lofty than the Greek and resembled a closely fitting skull cap with cheek pieces; but the centurions and officers seem to have had this surmounted with feathers. The shields were mostly rectangular, richly decorated, and made of wood and leather. The northern races seem to have long been without any defensive armour but the circular shield or "war board" of wood or leather, strengthened by cross bars of iron springing from a central boss or "umbo" of the same metal, though in the *Sagas* chain mail is rarely referred to. Usually the head dress was of leather on a metal framework, and as time went on they adopted the padded coats, scaled or mailed (from the British word "mael" or iron) tunics, and other armour similar to those worn by the nations with whom they came in contact. As a rule the legs were left bare or covered with "leg bands" of cloth or leather.

Both the Anglo-Saxons and early Normans of the time of the Conquest were practically dressed alike, with close-fitting steel helmets, having a vertical bar or "nasal" in front, and with usually a long surtout of leather, having short sleeves and reaching below the thigh, covered with either circular or lozenge-shaped (mascled) scales, or rings of iron. The shields were long and pointed at the base, with occasionally rude figures painted on them. The long mailed shirt or *hauberk* soon became shorter and was made of interwoven rings of steel (chain mail), with a hood of the same material,

over which fitted the iron helm, now without a "nasal;" and by the thirteenth century the armourer's craft had so far improved that the mail coat had sleeves covering the arm and hand, and the legs were throughout similarly protected. Instead of the small open iron cap, a large helmet, or *heaume*, which nearly reached the shoulders and had a closed visor, was substituted about the time of Henry II. This, the period of "chain mail," lasted until the reign of John, and was followed by that of "mixed armour" of plate and mail. First the iron cap that covered the mail hood replaced it altogether, the neck being protected by a strip of mail depending from the helmet. This was the *camail*. Then over the knees, elbows, and shoulders were strapped plates of iron to strengthen these parts, followed by arm, thigh, and leg guards, and the helmet still open became more conical in form. Finally mail ceased more and more to be worn, except as a small skirt or apron in front of the lower part of the body, and the whole body was encased in steel; while the helmet was closed with a visor through which the knight could see and which could be raised if he chose. For mounted knights the leg armour of course only protected the front part of the legs. This, the period of plate armour, terminated practically in the reign of Henry VIII. The shield at first was small, triangular, and suspended at the neck of the warrior; but it soon fell into disuse. The parts of the armour were named:—Head, *helmet*, *helm*, *salade*, or *bassinet*; neck, *gorget*; shoulders, *pauldrons*; arms (upper) *brassarts*, (lower) *rambraces*; elbows, *coudières*; hands, *gauntlets*; body, *corslet* or *hauberk* (breast plate and back piece); loins (front), *tasses*, (rear) *garde de reins*; thighs, *chausses* or *cuisses*; knees, *poleyns* or *genouillières*; ankles, *jambes*; and feet, *sollerets*. The latter shared the general change in the fashion of dress, being pointed in the reign of Edward IV., and broad with square toes in that of Henry VII. and VIII. Similarly the cuirass frequently altered its shape, and was in the last mentioned reigns globose. In some cases it resembled the long doublet, and was called the "peascod-bellied" corslet. The rapid improvement in firearms that occurred as the sixteenth century advanced led to the rapid diminution in the amount of armour worn. Helmets became more open as the need for personal direction arose; *greaves* and *sollerets* went first, long boots taking their place; the *tasses* were replaced by *cuissarts* or thigh pieces from the hips to the knees; *pauldrons*, *gauntlets*, and *arm-pieces* gradually disappeared as it became necessary to thicken the defensive cuirass against musket balls; the foot soldiers wore only the open morion with a buff coat. By Charles II.'s time only the breast plate and back piece, with an open helmet, having at first a triple bar and later a single bar in front to guard the face, remained; and when James II. reigned the latter also disappeared. The legs were covered with enormously thick and heavy jack boots, and the head with a feathered hat. When William III. came to the throne only a large gorget of steel was worn round the neck, and this gradually diminished until it became merely an ornament or badge of office, made of brass and suspended by a riband in front of the collar. It was in use in the English army till some years after the Peninsular War. The modern cuirass is merely an ornament and is valueless against bullets. Michel's Brigade of Cuirassiers charging the Eleventh German Corps armed with the needle gun was practically destroyed. For rough chronological remembrance it may be taken that the twelfth century was that of ringed mail; the thirteenth of true chain mail; the fourteenth of mixed mail and plate; the fifteenth, plate-armour; the sixteenth, fluted and globular plate-armour; and the seventeenth, half-armour.

Armourer, one who makes arms or who keeps them in repair. In the British army each troop of cavalry and each company of infantry has its armourer.

Armour-plates. [IRONCLADS.]

Arms. [SWORD, LANCE, GUNS, SHIELD, ETC.]

Armstrong, JOHN, a Scotch doctor and poet of the Georgian era, was born in 1709. He was a friend of Thomson, and taking him for a model, wrote verses on *The Art of Preserving Health*, and being appointed a military surgeon, was sent out to the war in Germany. In a poem addressed to his patron, John Wilkes, he offended Churchill, who resented the affront. He is referred to in Thomson's *Castle of Indolence* (c. i. st. 60), and he contributed the closing lines to that canto. He died in 1779.

Armstrong, WILLIAM GEORGE, BARON, born in 1810 at Newcastle-on-Tyne, where his father was a merchant and alderman. His first invention, the hydraulic accumulator, was followed by the hydraulic crane, and in 1846 his hydro-electric machine caused his election to the Royal Society. He now established the Elswick Works, and turned his attention to the improvement of heavy ordnance. With great perseverance he got the Armstrong gun adopted by Government, and presented his patents to the country, receiving knighthood and official recognition as his immediate reward. After several thousands of Armstrong's weapons had been supplied to the services, it was found that for use in the field and for penetration at short ranges the old muzzle-loading guns were safer and more effective. Armstrong, thereupon, left the service of the Crown, and returned to Elswick, where he continued to make guns and other heavy products of engineering art for any one who chose to buy them. The works at Elswick now cover about 200 acres, and employ over 20,000 artisans, and give a handsome profit to all concerned. In 1863, as President of the British Association, Sir W. Armstrong delivered an address on the limit of the coal supply, which led to the appointment of a Royal Commission. Besides the distinction of C.B., he received an honorary degree, both at Oxford and Cambridge, and many foreign orders and decorations, and in 1887 he was raised to the peerage. He died in 1901.

Army, a collection of men armed, drilled, and organised as a military machine, for fighting purposes. Its rudest form is that which obtained in

the early history of every nation, when all the able-bodied males of a tribe bore arms and fought offensively or defensively under a chosen chief. This prevailed when nomad or simple agrarian life was the rule, but later on, as civilisation became more complex, and commercial enterprise increased, they divided naturally into fighters and workers. The essential difference between these two conditions is that, in the latter case, the armed men are specially organised and trained, and their military service is more or less continuous.

Among the more ancient races, Egypt provided the first organised army, which was supported at a cost of one-third the revenue, and was divided into infantry, cavalry, and charioteers. It was practically a militia, liable to prolonged embodiment for such expeditions as the invasion of India by Sesostris, the success of which depended on its excellent organisation.

Greece followed next in importance, every free man, with a few exceptions, serving from 18 to 60 years of age, but it was still practically not a standing army but a very experienced militia. There were only two "Arms;" cavalry provided by the wealthier classes, and infantry by those of a lower degree, the latter being classed in four groups, depending on the amount of armour worn.

There were the *Hoplitai*, forming the bulk of the heavy column called the phalanx (from 2,000 to 4,000 strong), and the number of whom gave the numerical strength in a battle, the other troops frequently not being counted. The *Peltastai*, the *Psiloi* or skirmishers (usually slaves), and the *Gymnetas* or irregulars, who were frequently foreigners. Philip of Macedon adopted the same system, but kept the men permanently embodied, thus creating the first *standing* army. His infantry were heavy, light, and irregular; he introduced heavy and light cavalry. The Macedonian phalanx contained 1,600 heavy infantry, armed with 24-feet pikes, and arranged in 16 ranks, together with the same number of cavalry and irregular troops, thus resembling in number a modern army corps. Organisation, drill, and discipline all improved, and regular preparations were made for recruiting and reinforcing a field army. Greece seems to have furnished the first mercenary soldiers, as for example Xenophon's 10,000 Greeks in the army of Cyrus the Persian. In the Roman army the service was from 17 to 46 years of age, and at first compulsory; no one being entitled to take office until he had served ten years in the infantry or five in the cavalry. The conscripts were chosen by lot, divided into classes according to wealth, and after taking a military oath, were embodied in legions of about 4,500 men, formed somewhat like the phalanx, but in three lines. These were arranged with, first, the *Hastati*, medium infantry, next the heavily armed *Principes* and *Triarii*, and lastly the *Velites* or light troops, with a small force of cavalry. The legion was divided into ten maniples or companies, each with two centurions and two ensigns, and the velites were equally divided among the 30 maniples. Later on, allies or *Socii* were added, and the legion, now about 6,000 strong, was divided (by Gaius Marius, about 100 B.C.) into ten cohorts, resembling a weak modern division. Though at first a militia, as time advanced it became permanent and was paid. Drill and discipline were rigorous; and books such as that of Vegetius show that with them began the *art of war*, as distinguished from mere personal bravery in battle.

But with the fall of the Roman Empire this art fell also. Gauls and Goths fought as clans under chiefs, and this system gradually crystallised into the feudal system, which began by the natural assembly of the boldest youths round the best or most popular leaders, and gradually developed until, both with leader and followers, the chieftaincy and service became hereditary. The riches of the chief furnished the arms and armour, for which the retainer paid in service, and the money was provided by the more peaceful classes, whom he professed to protect from others to plunder them himself. Armies in those days were militia with a warlike training, the retainers serving for periods of from twenty days to three months, when the army was disbanded. As the evils of feudalism became more pronounced, many of these disbanded men, or others who had lost their all in the internecine struggles such a system infallibly produced, became mercenaries in the service of foreign powers, as "Dugald Dalgetty" or "Quentin Durward" did. The armies had little or no organisation or drill, and were composed of the knights and men-at-arms or cavalry furnished by the upper classes, and the vassals or infantry provided by the serfs and peasants. The arms of the knight were sword, lance and dagger; of the infantry, the pike or bill, and the bow and swords. Increase in wealth and the upgrowth of a powerful middle class, through the extension of trade, led to a greater use of mercenaries; the giving charters and freedom to cities was naturally followed by the formation of a permanent militia for their defence, and these soon surpassed in military value the less orderly following of the feudal chiefs; lastly, the Swiss infantry showed at Granson and Nancy that the days of mail-clad cavalry were passing away, and with the advent of gunpowder, which led to the disuse of the cumbrous body armour, the value of the knight as a fighting machine passed away too.

The beginning of standing armies in Europe dates back to 1445, when Charles VII. of France formed for permanent service and regular pay the "compagnies d'ordonnance," each of which contained 100 men-at-arms, with their attendants, and therefore numbered 9,000 cavalry, to which were added, in 1448, 16,000 infantry, called "francarchers." Even then this army was not so much national as foreign and mercenary; but the marked improvement in the drill, discipline, and organisation of men thus regularly paid and subsisted, led to a higher training of the force, and to a revival of the art of war. For in the sixteenth century the infantry were formed into definite fighting units called *battaglia*, whence the modern term battalion comes. The true tactical employment of cavalry as an arm, auxiliary to the infantry, began to be understood, and though the *battaglia* were at first composed of about equal numbers of pikemen and musketeers, or "shot," the

rapid improvement in firearms soon led to the abolition of the pike altogether, and to the armament of the whole body with muskets furnished with the bayonet. This, the "plug-bayonet," a dagger fitting into the muzzle of the gun, soon developed into the socketed bayonet; and the invention of flint locks in place of the match, with the substitution of iron for wooden ramrods, at length produced the "Brown Bess," so called from the colour of the barrel, which, until long after Waterloo, was the weapon of the infantry soldier throughout the world. Discipline further improved and was methodised by the introduction of "Articles of War" for the government of troops in the field, by Ferdinand I. of Spain, Francis I. of France, and Charles V. They were curious in their details and severe in their punishments. In the "Articles and Military Lawes to be observed in the Warres," whereby the "King of Sweden governed his army," the first clause states that "No Commander, nor private Souldier, whatsoever, shall use any kind of Idolatry, Witchcraft or Inchanting of Armes, whereby God is dishonoured, upon pain of death." Artillery improved with the musket, and, better mounted and better made, both in bronze and iron, it became more mobile; and with better powder and more carefully cast shot its range and accuracy increased. The tactical use of the arm, however, did not advance until the end of the eighteenth century; guns were not till then massed, and were attached singly to battalions and even cavalry squadrons. The effect of firearms at that time was not great, except at very close quarters. The field gun ranged 1,500 to 2,000 yards, the "Brown Bess" was good at 150 yards. Even as late as 1829 an old drill book introduces the following answer: "If a man do not strike the target at forty yards, I decrease the distance to thirty yards, and so on till he hits it." On these facts depend the formation and even composition of the armies of those days. The density of the masses diminished by degrees. The battalions of Maurice of Nassau, each built up of 250 pikes and 250 shot, and deployed in ranks ten deep, had, by the seventeenth century, been reduced to four ranks all armed with firearms. Eugene and Marlborough, Condé and Turenne improved the administration of the armies by the formation of brigades and divisions; while to Frederick the Great is due the further reduction to three ranks, which obtained in Prussia till recently and in the British army until the Peninsular War, the introduction of horse artillery to work with cavalry, and a definite and concise drill-book. But for long years the peace strength of standing armies was very small. Forces raised by voluntary enlistment for a war were disbanded when it ceased. Though organised in battalions, the troops were often raised by contract, and were often built up of independent companies carrying each its own colour. A survival of this principle, which applied both to cavalry and infantry, is seen in colours carried by each squadron of the Life and Horse Guards. Both companies and *battaglia* were far stronger then than now. The former have diminished from 600 to 120 of the British, and 250 of the German army; the latter from many thousands have fallen to two battalions of British and three battalions of Germany, each of which numbers 1,000 men. The number of companies in a battalion has remained practically unchanged. In Britain there are still six to eight, and in Prussia the number has only fallen from five in Frederick's reign to four now. The French Revolution caused a complete change in the art of war. Divisions, with a proportion of the three "Arms," infantry, cavalry and artillery, appeared in 1792; army corps in 1804. The Germans and English fought in line, the French in column; but the use of skirmishers to cover the deployment of both became universal as time went on. The most marked result of the Napoleonic wars was the birth of the present system which obtains throughout all Europe, except in Great Britain. The French formed armies by conscription under the "law of 1798," whereby all able-bodied men were bound to serve from their 20th to their 25th year. After the crushing defeat of Jena the Prussians were compelled, by the treaty of Tilsit, to maintain an army of only 43,000 men permanently embodied, but Scharnhörst evaded this by introducing a system of very short service in the ranks, and thus having behind the annual armed strength of the country a great body of trained men, who, when recalled to the colours, increased it at once to three times its nominal numerical value. This system of short service and reserves has spread broadcast, and has once more made armies "national." Only by its means can the vast armies of modern times be kept up. Napoleon's effort to keep Prussia in subjection after 1805 resulted in the commencement of a system that led to his own defeat at Waterloo, and the equally crushing defeat of his descendant at Sedan. England alone, of all the European powers, still holds the system of voluntary enlistment; all other nations have accepted the evil of conscription. Her army has grown and kept pace with those of the Continent, though in a different way, owing to the authority of Parliament over it. The first clause of the Army Annual Act, which fixes the exact number of men to be paid in the army, commences, "Whereas the raising or keeping a standing army within the United Kingdom of Great Britain and Ireland in time of peace, unless it be with the consent of Parliament, is against law."

It only differs from the preamble of the "Mutiny Act" which it replaced, by the omission of the words "and for the protection of the balance of power in Europe." The tenacious insistence that the army is that of the Parliament and not of the sovereign dates far back. Cromwell's army was at the end a standing army (this was the commencement of a standing army in England), being permanently paid and embodied, but was disbanded at the Restoration. Charles II. was allowed 3,000 men for "guards and garrison," composed of the Yeomen of the Guard, the Gentlemen-at-Arms, Monk's Regiment (afterwards the Coldstream Guards), the two Regiments of Life, and one of Foot Guards. These had by the end of the reign increased to 16,500 men, by the addition of three regiments of foot, but the militia was then the constitutional army of the state, to which all owed service by ballot.

It was only when the first Mutiny Act was passed by Parliament in 1689, giving officers the right to punish for the offences of mutiny and desertion, that a standing army was reluctantly acknowledged to be a necessity. It was raised by voluntary enlistment, at first for life or for a campaign, then in 1847 for continuous short service of ten years, then in 1866 for twelve years, and in 1870 to a limited engagement of twelve years, of which a certain number should be passed with the colours and the remainder with the reserve. England cannot be said to possess a standing army in the strict sense of the word, since by the mere non-passing of the Mutiny Act her army would cease to exist. In the 18th century regiments were raised by contract, the contractors receiving the nomination of officers to whom they sold the commissions. This laid the foundation of the system of purchase, abolished in 1871. At that date a commission for an ensign cost £450, and for a lieutenant-colonel of the Life Guards £7,250; but in addition a variable sum of "over-regulation" money was paid. There are, therefore, still three plans of forming an army in the world, of which the militia system is illustrated in America and in Switzerland; conscription in Germany, France, and elsewhere; and voluntary enlistment, as in England; but in *all* European countries the recruits, however selected, pass a small portion of their enlistment time only with the colours, and a larger portion with the reserve. In Switzerland the army is cheap, costing about £5 per head for an assumed effective of about 150,000 men. Men are liable to serve from 20 to 50, serving the first thirteen years in the "Elite" (representing the permanent force); the next eight in the Landwehr; and the remaining eight in the Landsturm. America recruits a standing army of 91,000 for three years' service by voluntary enlistment, each State furnishing and controlling in addition its own militia. Great Britain maintains a native army in India, officered chiefly by Europeans; a small colonial force, a regular army of about 200,000 men, with a reserve of 70,000 (exclusive of about 74,000 in India), and a territorial army (brought into existence in 1908), the recruitment for which is entirely voluntary. Germany affords the most complete type of a continental army. The conscripts, who are selected by ballot for the annual draft, serve two years with the army, five years with the reserve, and five in the Landwehr. They are strictly localised. There are four companies to each battalion, three of the latter to a regiment; two of these form a brigade, two brigades compose a division, and two divisions an army corps (of about 36,000 men all told), to which are attached 84 guns. The cavalry are administered in brigades attached to the corps in peace, and as independent divisions with horse artillery in war. The staffs are kept up and appointed in peace, and the organisation is so complete that in twelve days the armed strength of Germany, numbering some 3,000,000 men, is ready to march fully equipped.

Army Council, a board, created in 1904, consisting of the Secretary of State, four military members, and two civil members. The military members are the organising and administrative heads of the War Office, each responsible with the Secretary of State for the work of the War Office, and each for the efficient working of the branches under his control. The civil members deal with the financial side of administration, and the pay of the Army.

Arnatto, the red pulp which covers the seeds of the South-American tree *Bixa Orellana*, used as a yellow or orange dye for silks, and for staining Dutch cheese and butter.

Arnaud, HENRI, a pastor of the Vaudois, who turned soldier to rescue his co-religionists from the tyranny of the Count of Savoy. He wrote a history of his adventures. William III. offered him an asylum in England, but he went with his exiled flock to Schomberg, where he died in 1721 at the age of sixty.

Arnauld. 1. ANTOINE, a member of a family in Auvergne, France, distinguished for piety and intellectual ability, was born in 1612. He was attracted to Jansenism, and wrote an enormous number of volumes in defence of his views and in opposition to Calvinism. He was forced to leave Paris and spent his last years at Brussels, dying in 1694.

2. JACQUELINE MARIE ANGELIQUE, sister of the above, was abbess-coadjutrix of the Port Royal at the early age of eleven. She found the Cistercian rules set at naught daily by the nuns under her charge. She soon showed herself to be an ardent and capable reformer, and after a long struggle reduced the various houses under her charge to perfect order. "The Mère Angelique," as she was named, combined with her great force of character a temper of perfect sweetness. Like her brother she was a Jansenist, and suffered for her opinions in her old age, when the Jesuits broke up the Port Royal convents and left her in want and desolation. She died in 1661. Her sister and her niece were also distinguished members of the same Order. [SAINT ARNAUD.]

Arndt, (1) ERNST MORITZ, a German patriot, poet, and historian, was born in 1769. He was destined for the Church, but in 1806 was appointed professor of history at Greifswald. He was one of the most earnest opponents of the "Napoleonic idea," and his book, *The Spirit of the Time*, made it necessary for him to fly after the battle of Jena. He returned in 1810, but on the renewal of war withdrew to Russia. There now flowed from his pen a series of soul-stirring tracts rousing Germany to resistance, and his songs were even more powerful than his prose writings. The most famous of them, *Was ist des Deutschen Vaterland?* is as popular to-day as it was seventy years ago. After the conclusion of peace Arndt was appointed to the chair of history at Bonn, but his out-spoken liberalism gave offence, and he was forbidden to lecture though he received his salary. In 1840 his lips were unsealed, and in 1848-9 he was sent as a deputy to the National Assembly at Frankfort, but resigned with the rest of the Constitutional

party. He continued lecturing and writing till he was past eighty, and died in 1860.

2. JOHANN, a Lutheran divine, born at Ballenstadt in 1555. He was ordained, and ministered in various places, but his opposition to the lifeless, doctrinal, argumentative Christianity of the day brought him many enemies, and forced him to abandon more than one cure. His book on *True Christianity* produced, however, a reaction in favour of a religion of the heart, and he seems to have passed his last days in peace as general superintendent at Zell, where he died in 1621. His influence is still felt in Germany.

Arne, THOMAS AUGUSTINE, a celebrated English musician, born in 1710. He went to Eton, where his taste for music was repressed, and he was articled to a solicitor on leaving school. Nevertheless he contrived in his leisure to acquire such a knowledge of the art that in 1732 his father gave way and allowed him to take his own course. His first work, an opera entitled *Rosamond*, was composed for the appearance of his sister, afterwards Mrs. Cibber, and during upwards of forty years he produced a succession of pieces in every style, from songs for Vauxhall to sonatas and oratorios, such as *Abel* and *Judith*. His operas were highly popular, and *Artaxerxes*, the first attempt to apply Italian methods to English compositions, held the stage for eighty years. His fame rests on none of his more ambitious efforts, but on the air of *Rule Britannia*, introduced into the *Masque of Alfred*, on his setting of the Shakespearian lyrics, *Where the Bee Sucks*, *Blow, Blow, thou Wintry Wind*, etc., and on his sweet and tuneful glees. He died in 1778.

ARNICA (*A. montana*).

Arnee, the native name of a very large variety of the Indian buffalo, standing nearly six feet at the shoulder, bulky in proportion, and with horns upwards of six feet in length. This race occurs wild in the Indian Islands and in Farther India, but has also been domesticated as a beast of burden. [BUFFALO.]

Arnhem, or ARNHEIM, the capital of the province of Guelderland, Holland, situated on the right bank of the Rhine, about 50 miles from Amsterdam. It was formerly the residence of the Counts and Dukes of Guelderland (Egmont), whose tombs may be seen in the church of St. Eusebius. In 1672 Louis XIV. took it. It was recaptured in 1813 by the Prussians. The old fortifications are still maintained. Being a connecting point between the Dutch and German railway systems it has a large transit business, and cottons, woollens, paper, and tobacco are manufactured.

Arnica, a genus of plants belonging to the order *Compositæ*, the tincture of one species of which, *A. montana*, a native of Central Europe, has a powerful action in exciting the circulation beneath the skin without blistering, and is, therefore, useful for bruises. Internally it is an acrid narcotic. The flower is a dark golden yellow, and blossoms from about June to August.

Arnim, (1) LUDWIG ACHIM VON, a German poet and novelist, born in 1781. He began life as a doctor, but soon adopted letters as a profession. His stories are gloomy and fantastic, like those of Hoffmann, the best known being *Countess Dolores*, *Isabella of Egypt*, and *The Winter Garden* (a collection of sketches). He published a number of popular songs and a few dramas, dying in 1831.

(2) HARRY KARL EDOUARD, COUNT VON, born in 1824. He entered the Prussian diplomatic service, and after holding several minor posts was sent, in 1864, as Ambassador to Rome, where he remained until Pius IX. was deprived of his temporal power in 1870. During the famous Œcumenical Council he supported Dr. Döllinger and the Old Catholics, and opposed the doctrine of Papal Infallibility. In 1871 he was sent to Paris, and is said to have foiled Bismarck's policy. In 1874 he was recalled, and practically banished to Constantinople; but before he had started thither the anonymous publication of his correspondence with Dr. Döllinger and his despatches from Rome gave so much annoyance that he was detained. He was then charged with having carried away from the Paris Embassy important State papers relating to the Papal succession. He was tried for this offence and condemned to three months' imprisonment, and on his appeal the sentence was raised to nine months. Later Arnim was again brought to trial, and condemned, in his absence, to five years' penal servitude. Though he made some attempts at a reconciliation, he never returned to Germany, and died at Nice in 1881.

Arno (classic *Arnus*), a river of Italy, which, rising in Monte Falterona, in the Apennines, flows first south, then north, then west, and, after a course of 180 miles, enters the Mediterranean by an artificial channel eight miles below Pisa. It has one tributary, the Elsa. The valley of the Arno is one of the most beautiful and fertile in Italy, but in winter the stream becomes a dangerous and swollen torrent. Florence occupies a charming position on both banks about 50 miles from the sea.

Arnobius, (1) THE ELDER, an African convert to Christianity, born in Numidia about the middle of the third century. He wrote a Latin treatise in support of his new faith (*Disputationum adversus Gentes, libri vii.*). Lactantius was his pupil.

2. THE YOUNGER, was a Gallic bishop or presbyter, who flourished at Marseilles about 460 A.D.

He wrote a commentary on the Psalms which is tinged with Pelagianism, and this fact has induced some to believe that he was the author of an anonymous treatise entitled *Prædestinatus*.

Arnold, (1) of Brescia, a religious reformer of the twelfth century. He was a pupil of Abelard, and returning to Italy as a monk began to denounce the corruptions of the Church and the greed of ecclesiastics. Though condemned by Innocent II. and the Lateran Councils in 1139, he was so strongly supported that from 1144 to 1154 he held possession of Rome, drove out the popes, and established a republic. Adrian IV., assisted by Barbarossa, forced him to fly into Tuscany, where he was captured and put to death.

(2) Of Winkelried, a Swiss hero, who at the battle of Sempach in 1386 rushed upon the spears of an impenetrable Austrian phalanx, and by thus sacrificing his life opened a passage for his countrymen. The result was a total rout of the Austrians with fearful slaughter. This story, however, rests on late evidence, and there has been much controversy in Switzerland and Germany since 1860 as to its truth.

(3) GOTTFRIED, an earnest, active, but somewhat harsh and gloomy religious reformer, who strove, like Arndt, Spener, and Francke, to infuse new life into the effete orthodoxy of German Protestantism. He was born in 1665, and held a variety of posts, never retaining any for long owing to his pietism and his temper. In 1704 he was appointed royal historiographer by Frederick I., and was subsequently made pastor and inspector of Perleberg, where he died in 1713. He wrote a Church History, which was severely handled by Mosheim.

(4) BENEDICT, an American general, born in 1741 in a humble station. He twice enlisted in the British army, and twice deserted. When the Revolution broke out he was in business at New-haven. After the battle of Lexington he raised a volunteer corps, was appointed colonel, served under Allen at Ticonderoga and Montgomery in the march to Quebec, and after rather a stormy career got the governorship of Philadelphia. His recklessness and perhaps dishonesty caused him to be reprimanded, whereupon he entertained the idea of going over to the enemy. Washington, who valued him for his pluck and dash, gave him the command at West Point; and Sir Henry Clinton sent Major André to negotiate for the surrender of the fortress. André was caught on his way back to the British lines, and was executed. [ANDRÉ.] Arnold escaped, joined the British army, fought for some years against his former comrades, and died in England in 1801.

(5) MATTHEW, poet, critic, theologian, and educationalist, the eldest son of Dr. Arnold (q.v.), born at Laleham, near Staines, on the 24th December, 1822. Educated at Winchester, Rugby, and Balliol College, Oxford, he carried off the Newdigate prize for English verse in 1843, graduated in honours in 1844, and was elected Fellow of Oriel in 1845. In 1851 he was appointed Lay Inspector of Schools under the Committee of Council on Education, an office which he served for nearly thirty-five years, resigning in 1886. During this period he did the cause of education signal service, especially by his investigations into Continental education, of which some of the results were given to the public in 1868 under the title *The Schools and Universities of the Continent*. His public career as a poet began with the appearance in 1843 of his Newdigate poem, *Cromwell*. In 1848 *The Strayed Reveller* was sent to the press as the work of "A," followed in 1853 by *Empedocles and other Poems*, published anonymously. Here his poetical life ended, save for a few casual effusions for the magazines. If he produced too little to rank as a great poet, his work was of a very choice order, and his fame as a poet is still growing. As a critic his career may be dated from 1857, when he was elected Professor of Poetry at Oxford. His lectures *On Translating Homer* appeared in 1861; his *Essays on Criticism* in 1865; and his *Study of Celtic Literature* in 1868; a second series of *Critical Essays* being published posthumously in 1888, edited by Lord Coleridge. His primacy among the critics of his day was undisputed. While working from fixed principles, he was always catholic and sympathetic; and to him more than to anyone else is due the more genial spirit which has come over English criticism. His very considerable work as a theologian, which showed him to be a thinker of quite uncommon originality, with profound ethical insight, is represented by *St. Paul and Protestantism* (1871), *Literature and Dogma* (1873), *God and the Bible* (1875), and *Last Essays on Church and State* (1877); his contributions to political and social criticism by *Culture and Anarchy* (1870), and *Irish Essays and Others* (1882). He died quite suddenly on April 15th, 1888.

(6) SAMUEL, Mus.D., an English musician, born in 1740, came early under the influence of Handel. He was director of music at Covent Garden and the Haymarket, organist of the Chapel Royal and Westminster Abbey. He wrote several operas, of which *The Maid of the Mill* was the most popular, and a number of oratorios, amongst them *The Prodigal Son*, not to mention a profusion of songs, services, sonatas, concertos, etc. None of his productions, however, show any great talent, and his edition of Handel's works did him little credit. Early in the 19th century he built the Lyceum Theatre as a home for English opera, but died in 1802 before it was opened. He was buried with great solemnity in Westminster Abbey.

(7) THOMAS, D.D., was born at East Cowes, where his father was collector of customs, in 1795. He went from Winchester to Oxford, and after a brilliant career at the university married and settled at Laleham near Staines in 1819, supporting himself by private tuition. Though ordained deacon, his scruples as to signing the Thirty-Nine Articles prevented his taking priest's orders till 1828, when he was appointed head-master of Rugby School. It was there that the work of his life was done, and that work wrought a complete revolution in English education. It is not easy to explain briefly the way in which this was effected. Perhaps the most powerful agency that Arnold employed

was the cultivation of a sense of honour as the basis of discipline. But his own personal influence, and his incessant care and sympathy for boys, account in a large measure for his success, and the standard which he set asserted itself gradually in all the public schools. His religious views were characterised by breadth combined with genuine and cheerful piety. In politics he passed from Toryism to such pronounced Liberalism as destroyed his chances of Church preferment. He wrote his *Roman History*, his valuable edition of Thucydides, his *Commentary on the New Testament*, and a treatise on *Church and State* which was to serve as the foundation for a greater work. In 1841 he was appointed Regius Professor of Modern History at Oxford, and his lectures in the following year opened with an able discussion of the philosophy of history. In June, 1842, he was seized with angina pectoris, and died in a few hours on the eve of his forty-seventh birthday. His *Life and Correspondence*, edited by the late Dean Stanley, furnishes a sympathetic record of his labours and achievements.

(8) T. K., the educationalist, born 1800, was a country rector. In 1838 he issued his *Greek Prose*, and in 1839 a companion volume on *Latin Prose Composition*. He died in 1853.

Arnott, DR. NEIL, a physician and man of science, was born at Arbroath in 1788. In 1811 having completed his medical education he began to practise in London. Though he soon got a fair business, he devoted himself to physics and mechanics, lecturing as early as 1813, and hitting upon new inventions year after year. In 1827 appeared the first edition of his *Physics*, which at once took its place as a standard work. He was appointed to the Senate of the newly created London University, and busied himself in planning the medical and scientific examinations. In 1838 he was made physician extraordinary to the Queen, and F.R.S., and in that year he published his work on *Warming and Ventilation*, a subject to which henceforth he gave great attention. He won for his hygienic inventions a gold medal at the Paris Exhibition (1855), and for his smokeless stove the Rumford Medal of the Royal Society. He died in 1874.

Arnsberg, a district in the province of Westphalia, Germany, with its chief town. The latter is built on a height near the river Ruhr, and was the capital of the ancient duchy, and a member of the Hanseatic League. A new quarter has sprung up during the 19th century. There are works for turning out railway plant, and for making shot, white lead, cloths, etc.

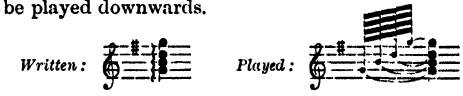
Aromatic Series, in *Chemistry*. All substances whose molecules contain a benzine nucleus are classed in the aromatic series; they are particularly rich in carbon. The name was given to the group on account of the number of substances possessing an aromatic odour (balsams, gum-resins, etc.), which belong to it.

Aromatic Vinegar, a strong perfume, frequently used as an excitant and disinfectant. It is made by adding to strong acetic acid a variety of aromatic oils.

Aroostook, a river of North America, which rises in the State of Maine, and joins the river St. John at Hopkins. W. D. Howells, the novelist, has made the name familiar to modern readers; but in past times it has played a part in boundary disputes between Great Britain and the United States.

Arpad, a hero of Hungary, born about 870. He speedily gained a footing in the country and established a dynasty which lasted until 1301, nearly 400 years after his death, which occurred in 907.

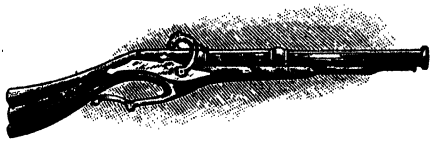
Arpeggio, in *Music*, the playing of the notes of an instrumental chord in rapid succession and not simultaneously, after the manner of a harp. The *arpeggio* is generally played upwards, but may be played downwards.



Arpino (classic *Arpinum*), an Italian town in the province of Catula on the river Garigliano. Cicero and Marius were born here.

Arqua, a village 12 miles south of Padua, in Italy, in the midst of the Euganean Hills. Petrarch died here in 1374, and his tomb is shown in the churchyard.

Arquebus, an old hand-gun, which was supported on a forked rest and which carried a ball



ARQUEBUS.

of about two ounces in weight. In Henry VII.'s time half the yeomen of the guard were armed with arquebuses.

Arques (anc. *Archiæ*), a village in the department of Seine Inférieure, France, about three miles south-east of Dieppe. It is situated at the point where a little stream of the same name is joined by the Béthune. The remains of a strong castle show the former importance of the place; and here Henry IV. defeated the Duke of Mayenne in 1589.

Arracacha, an umbelliferous plant, native to the Andes, cultivated in Venezuela and naturalised in Jamaica. The plant was unsuccessfully introduced as a substitute for the potato about fifty years ago.

Arracan, ARACAN, or ARAKAN, the north division of Burmah, on the east of the Bay of Bengal, stretching from the river Naat to Cape Negrais. It is 400 miles long, but in breadth tapers off from 90 miles in the north to 15 miles in the south, and the area is 18,530 sq. m. The coast is studded with many fertile islands. Inland a range

of almost impassable mountains (Yomadang) separates the country from Pegu and Ava. The chief rivers are the Naf, Myu, Koladyne, and Lemyu, and the ports are Akyab, the capital, Kyuk Phyu, and Sandoway. A considerable export trade is done in rice, wax, ivory, drugs, honey, rubies, and sapphires, and all kinds of manufactured goods are imported. The district, formerly an independent kingdom, was conquered by Burmah in 1783, and by the British in 1824. The fortified city of the same name was formerly the capital, and is situated inland on a branch of the Koladyne. It is very unhealthy, and is decreasing in importance.

Arrack, a name of Arabic origin, applied to a variety of distilled spirits used in the East. In Ceylon it is distilled from the toddy or fermented juice of the Palmyra and Cocoa-nut palms; in India from Mahwa flowers and from rice; in Java from molasses.

Arrah, a town in the district of Shahabad, Bengal, British India, 36 miles from Patna. It is famous for the gallant defence which it offered in the hands of a few Englishmen and Sikhs to thousands of rebels during the mutiny.

Arran, an island on the W. coast of Scotland, near the estuary of the Clyde, and forming the greater part of the shire of Bute. It is 20 miles long by 8 to 11 broad, has an area of 165 square miles. The soil is sterile but mountainous and picturesque, possessing from the variety of its strata great geological interest. Goatfell, the highest point, has an elevation of 2,865 feet. Caves are frequent, and in one of them Bruce found a refuge. Flax is cultivated, and a few linen and woollen fabrics are made, but sheep-breeding is the chief industry, and tourists bring money into the island. Fish are plentiful on the coast, and there is good shooting on the hills. Marble, jasper, agates, cairngorms, and crystals known as Arran diamonds, are found there.

Arran Islands. [ARAN.]

Arras, the chief town of the department of the Pas de Calais, France, on the river Scarpe, 36 miles from Amiens. It was taken by France from Austria in 1640, and only became finally annexed in 1659. The Hôtel de Ville, a handsome structure, dates from 1510. There is a cathedral, a bishop's palace, a picture-gallery, library, law-court, and other public buildings. It is the birthplace of the two Robespierres, of Damiens, and Lebon. Tapestry was once a famous local manufacture, and the name of the town attached itself to material of this kind. Dimity, lace, sugar, soap, and chinaware are now the chief products, and the corn-market is the largest in northern France. The Northern Railway of France has an important station here.

Arrest, a term applied to persons, to things, and to judgments. To arrest a person is to restrain him of his liberty by some lawful authority. Arrest is usually made by actual seizure of the defendant's person, but any touching, however slight, of the person is sufficient for this purpose. And arrest is not confined to corporal seizure; where the officer entered the room in which the defendant was, and locked the door, telling him at the same time that he arrested him, the court held this to be a good arrest. And if the officer say, "I arrest you," and the party acquiesce, or afterwards go with him, this is a good arrest. It seems that in order to constitute a valid arrest the warrant should be produced, or the party arrested made aware of it. Arrest in civil proceedings is now rare; the principal instances are when a person is arrested for contempt of court (ATTACHMENT), when the defendant in an action is suspected of intending to leave the country before judgment (Debtors Act); and in certain cases where a person has made default in the payment of a sum of money recovered or ordered to be paid by a court or judge, in penal actions, in summary proceedings before justices of the peace, and where the debtor has means to pay but refuses to do so. In criminal procedure arrest is generally made under a writ of *capias*, or *venire facias*, or a warrant. Arrest without warrant is only allowed in certain cases, as where a person is either seen committing an offence or is apparently about to commit some offence. In Admiralty actions a ship or cargo is arrested when the marshal has served the writ of summons in an action in rem. Under "Magna Charta" and the "Habeas Corpus Act," the liberty of the subject is secured from unlawful arrest.

Arrest of Judgment. On a criminal prosecution when there is some objection on the face of the record (*e.g.* a material mis-statement or uncertainty in the indictment not aided, that is, not corrected by the verdict) the defendant may at any time between conviction and sentence move the court in arrest of judgment, and if the objection is well founded, judgment of acquittal is given, which, however, is no bar to a fresh indictment. Under the old common law practice, where a defendant might have taken, but did not take, some objection of substance to the plaintiff's pleading by demurring to it, and a verdict was found for the plaintiff, the defendant might then take the objection by moving in arrest of judgment, and if the objection was well founded, judgment would not be entered for the plaintiff. As a judgment on a verdict is, under the new practice, only entered by order of the judge or court, this procedure is now inapplicable.

Arrestment, "a process of attachment prohibiting a person in whose hands a debtor's movables are to pay or deliver up the same till a creditor who has procured an arrestment to be laid on is satisfied, either by caution, *i.e.* security or payment according to the grounds of arrestment." In Scottish law the term denotes that process by which a creditor detains the goods or effects of his debtor in the hands of third parties till the debt due to him is paid. It is divided into two kinds:—1st, arrestment in security, used when proceedings are commencing, or in other circumstances where a claim may become, but is not yet, enforceable; 2nd, arrestment in execution, following on the decree of a court, or on a registered document under a clause or statutory power of registration, according to the custom of Scotland. By the process of

arrestment the property covered by it is merely retained in its place; to realise it for the satisfaction of the creditor's claim a further proceeding, called "Forthcoming," is necessary. By old practice alimentary funds, or those necessary for subsistence, were not liable to arrestment. In 1870 the wages of all labourers, farm-servants, manufacturers, artificers, and workpeople are not arrestable except (1) in so far as they exceed 20s. per week; but the expense of the arrestment is not to be charged against the debtor unless the sum recovered exceed the amount of 20s.; or, (2) under decrees for alimentary allowances and payments, as for rates and taxes imposed by law. It is also a process in Scotch law for bringing a foreigner or other debtor living abroad and not within the jurisdiction of the Scottish Courts, amenable to such jurisdiction to the extent of making any movable property he may possess in Scotland answerable for the claim. The analogous practice in England is the custom of foreign attachment in the Mayor's Court in the City of London.

Arrian, or FLAVIUS ARRIANUS, was born in Bithynia early in the second century. He served in the Roman army under Hadrian, and was prefect of Cappadocia in 135 A.D. He sat at the feet of Epictetus and took notes of his discourses, besides compiling from the same source a treatise on moral philosophy. Arrian's most important works are his *History of Alexander the Great*, an account of India, and a *Periplus*, or a description of the coasts of the Euxine. He also wrote on military subjects and on the chase.

Arrondissement, in France, a territorial division of a department. It is larger than a canton, which again is larger than a commune.

Arrow, a slender missile weapon, generally pointed, designed to be propelled from a bow. Frequently arrows are barbed at the tip, to make them more difficult of extraction, and sometimes they are poisoned. [ARCHERY.]

Arrow-head (*Sagittaria sagittifolia*), a common aquatic monocotyledonous plant, found in large quantities on the Thames.

Arrow Head. [FLINT IMPLEMENTS.]

Arrowroot, a valuable form of starch, obtained from the rhizomes or underground stems of various plants, mostly tropical species of the *Marantaceæ*, or allied orders. That from the West Indies, Bermuda, and Natal is from *Maranta arundinacea;* that from the East Indies mainly from *Curcuma angustifolia*, that from Otaheite, from *Tacca pinnatifida;* the "Tous-les-mois" of St. Kitt's, from *Canna indica;* and Brazilian arrowroot from *Manihot utilissima*, the cassava. An inferior preparation known as British arrowroot is made from potatoes; and formerly the corms of the common *Arum maculatum* were collected in the Island of Portland for a similar purpose.

Arrowsmith, the name of an English family to which geographical science is largely indebted. Aaron Arrowsmith was born in Durham in 1750. He came to London, and worked as an engraver. His chart of the world on Mercator's projection attracted notice, and was followed by other able productions, especially a general atlas published in 1817. He died in 1823. His most distinguished successor was a nephew, John Arrowsmith, who was born in 1790, and joined his uncle in 1810. The *London Atlas* was his work, and he helped to found the Royal Geographical Society. He died in 1873.

Arru, or AROO, a group of islands belonging to Holland and situated about 80 miles south of New Guinea. The largest of them, Tannar Besar, has a length of 77 miles and a breadth of 50 miles; the next in size, Cobron, is 69 miles long by 23 miles broad. The chief centre of trade is Dobbo, whither dealers come from Java, China, and the Moluccas to barter European goods for pearls, tortoise-shell, trepang, and bird-of-paradise feathers.

Ars, the name of two French towns: (1) *Ars-en-Ré*, a small port in Charente Inférieure, about 20 miles W.N.W. of Rochelle. (2) *Ars-sur-Moselle*, about 5 miles S.W. of Metz, where ironworks are established, and a good deal of wine is made.

Arsacidæ, a dynasty of Parthian kings founded about 250 B.C. by Arsaces, who obtained the crown from Antiochus II. There were thirty-one of the *Arsacidæ*. [PARTHIA.]

Arsenal, a magazine or repository of military stores of all kinds; the term has also been extended so as to include factories for arms or ammunition. The chief arsenal in Britain is the Royal Arsenal at Woolwich, while others of importance are those at Portsmouth, Chatham, Sheerness, Pembroke, Deptford, and Plymouth. In France, Brest, Toulon, Havre, Bordeaux, etc., are famed for their naval arsenals, and Besançon, Mézières, and Toulouse for their ordinary military stores. All the continental powers, as well as the United States of America, have their various arsenals.

Arsenic (As = 75). An element known from the earliest times. Sometimes found native, but usually as sulphide in combination with sulphide of iron. Prepared from the ore by heating the latter in earthen vessels, the metallic arsenic sublimes, and is condensed in a suitable receiver. It is a steel-grey brittle metal, which volatilises at a dull red heat without melting, and gives off an odour of garlic: it oxidises slowly in the air at ordinary temperatures, and rapidly if heated, into arsenious oxide (As_2O_3). Arsenic is on the border line between the metals and non-metals, resembling the former in physical properties, and the latter in its chemical relations. Compounds of arsenic are used in medicine, and the metal itself in the manufacture of leaden shot, and the preparation of alloys generally. *Arsenic* is used medicinally in minute doses in certain forms of skin disease, and also in some digestive and nervous affections. A curious point connected with its prolonged use is the "tolerance" to its action which becomes established. The well-known arsenic eaters of Styria, beginning with small doses, become in the course of time able to consume a quantity of arsenic which would prove fatal to an ordinary person.

The symptoms of arsenical poisoning are epigastric pain and tenderness, vomiting and diarrhœa; collapse rapidly develops and death may occur in a few hours, if a large quantity of poison has been consumed, or in less acute cases life may be prolonged for some days, and cramps, tremors, or even convulsions may then appear, and if recovery should take place these nervous phenomena may persist for some time. Arsenic has been at times administered in small, repeated doses to avoid suspicion rather than in one large dose; in such cases vomiting and wasting with coryza and irritation of the conjunctivæ have been the most prominent symptoms.

The congested state of the mucous membrane of the digestive tract after death, and the application of Marsh's and Reinsch's test to the contents of the stomach, usually leave no doubt in suspected cases of arsenic poisoning. Emerald green, or aceto-arsenite of copper, has given rise to unpleasant symptoms, from its use in confectionery, in painting children's toys, and particularly in connection with wall papers. So much attention has been directed to this subject that such cases of chronic poisoning are now fortunately becoming rare. The treatment of acute arsenic poisoning consists in thoroughly evacuating the contents of the stomach, and administering the freshly precipitated hydrated peroxide of iron.

Arsinoë, the name borne by several Egyptian princesses. (1) The daughter of Ptolemy I., who about 300 B.C. married Lysimachus, King of Thrace. After his death being persecuted by Ptolemy Ceraunus, her half-brother, who married her, and murdered her children, she became the wife of her brother, Ptolemy Philadelphus. (2) The daughter of Ptolemy Euergetes, called Cleopatra by Livy. She married her brother Ptolemy Philopater, accompanied him in his war against Syria 217 B.C., but was put to death by her husband through the influence of a mistress. (3) The daughter of Ptolemy XI., and sister of the famous Cleopatra, at whose request she was put to death by Antony. Several towns, notably Suez and Crocodilopolis, were named Arsinoë after one or another of these princesses.

Arsis, in *Prosody*, originally the *unaccented* part of a foot; now, however, the *accented* portion; while *thesis*, now the unaccented, was formerly the accented part. In *elocution* arsis is the raising of the voice and thesis the depression. In *music* arsis is the downward beat and thesis the upward, as the ancients used to beat time in exactly the opposite way to the moderns—their upward beat signifying the accented portion of the bar.

Arslan (*the lion*), the title given to Ali Pasha, an Albanian chief born in 1741, who gained possession of a large portion of Albania early in his career. In 1787, for his services to the Porte in the Austro-Russian war, he was created pasha, and in 1797 he entered into an alliance with Napoleon, but very shortly broke it off. He did a great deal of good in his own territory in putting down brigandage and disorder. In 1803 he subdued the Suliotes of Epirus, while in 1807 he again concluded a treaty with Napoleon and again severed the alliance. In 1820, in consequence of his efforts after complete independence, the Sultan ordered his deposition, and in 1822 Arslan, who had yielded to a false promise of security, was put to death.

Arson, the malicious and wilful burning of the house of another, is at common law of the degree of felony. Some part of the house must be actually burnt; a bare intention or attempt will not constitute the offence, but the burning of any part, however trifling, is sufficient. The burning must be malicious and wilful. If a man by wilfully setting fire to his own house burn that of his neighbour, it will be felony. Barns with corn and hay in them, though distant from a house, are within the definition of a house. The Act of 1861 prescribes on conviction for arson penal servitude for life, or for any term not less than three years (now five years), or to be imprisoned for any time not exceeding two years; the offence of setting fire to goods in buildings in such circumstances that the latter were thereby set on fire, would be felony. Setting fire to mines is visited with the full measure of penalty, and the attempt, to penal servitude for fourteen years. Setting fire or attempts to set fire to ships is punishable by the full penalties already enumerated. Setting fire to His Majesty's vessels of war is punishable by death. In Scotland the offence equivalent to arson in England is known as wilful fire raising. The statutes above cited do not apply to Scotland. Where the crime is punishable capitally by old Consuetudinary Law, the Public Prosecutor can decline to demand capital punishment, and usually does so.

Art, a system of rules for the acquisition of skill and dexterity in the performance of certain actions. The "arts" as formerly used in the universities meant the seven *liberal arts* of the ancients, viz. grammar, logic, rhetoric, arithmetic, music, geometry, and astronomy. Now-a-days, however, the classification of *arts* has been divided into two parts, the *fine arts*, in which are included music, painting, sculpture, etc., and all those branches of study which seek expression through the beautiful; and the *mechanical arts*, including carpentry, watchmaking, etc., and all those pursuits in which genius is not essential for success, but which require technical skill or physical accomplishment. The word *art* is frequently applied in a restricted sense to painting or sculpture only, and information upon *Painting*, *Schools of Painting*, etc., will be found under their various headings. For explanation of the terms Bachelor of Arts, Master of Arts, *see* the headings BACHELOR and MASTER.

Arta, or ZARTA (classic *Ambracia*, Turk. *Naida*), a town in Albania, 39 miles south of Janina on a river of the same name, which flows into the spacious and picturesque Gulf of Arta, formerly the Ambracian Gulf.

Artabazus, (1) a general who served under Xerxes in the expedition against Greece. He ably seconded Mardonius at Platæa, and made a

masterly retreat to Byzantium after the defeat of the Persians in 480 B.C.

(2) Satrap of Ionia about 356 B.C. He revolted against Artaxerxes Ochus, but was restored to favour, and remained loyal to Darius Codomannus till he fell after Arbela. Alexander then gave him the satrapy held by Bessus, the murderer of Darius.

(3) King of Armenia, where he succeeded Tigranes. It was his treachery that led to the ruin and death of Crassus, and he also betrayed Antony, but was taken and put to death in 30 B.C.

Artaxerxes (Pers. *Artakhshatra*, Great Warrior), the name of several Persian monarchs.

I. LONGIMANUS, so called because his right hand was longer than his left, was the son of Xerxes I. He killed his elder brother, and when Artabanus, after assassinating Xerxes, seized the throne, he defeated and slew him and began to reign in 465 B.C. He distinguished himself by moderation and greatness of mind; and on the whole enjoyed tranquillity. He permitted the Jews to resume worship in the Temple, and gave an asylum to the banished Themistocles. He died in 425 B.C.

II. MNEMON, son of Darius II., by the daughter of Artaxerxes I. His brother Cyrus revolted, and was defeated and slain at Cunaxa 401 B.C. The retreat of the Ten Thousand, made memorable by Xenophon, followed upon this campaign. Then followed the efforts of the Greeks, and especially of the Lacedæmonians under Agesilaus, to free the Greek cities of Asia. In 394 the Athenians under Conon, aided by Pharnabazus, a Persian satrap, defeated the Spartans at Cnidus, and in 388 the shameful peace of Antalcidas put an end to hostilities. Artaxerxes died in 359 B.C. at the age of ninety-four, leaving a reputation for leniency and wisdom.

III. OCHUS, son of the preceding monarch, came to the throne after killing off some thirty brothers. He crushed the revolt of Artabazus, and with the help of Greek mercenaries subdued the Egyptians, killing and eating the sacred bull Apis. Detested for his cruelty, he was poisoned by Bagoas, his trusted eunuch.

IV. [SASSANIDÆ.]

Artédi, PETER, a Swedish naturalist, born in 1705. He and Linnæus were such close friends that they made a mutual bequest to each other of all their manuscripts. Artédi was drowned in 1738, and Linnæus therefore published his *Bibliotheca Ichthyologica*, and *Philosophia Ichthyologica* in 1738.

Artel. A Russian organisation somewhat resembling a trade union on co-operative principles. Each member is apportioned an equal amount of work, and each receives an equal sum in remuneration. What surplus arises from their united labours is held in a common fund and divided yearly.

Artemia, the Brine shrimps, small PHYLLOPODA living in salt pans, lagoons, and salt lakes.

Artemis, a genus of VENERIDÆ, or Venus shells; it ranges from the Carboniferous period upwards. To be found on the British coast.

Artemis, in Greek mythology, the daughter of Zeus and Leto, and sister of Phœbus, ranking among the great divinities. Like her brother she is generally represented with a bow, arrows, and quiver; and to her also the laurel was a sacred tree. She was the goddess of hunting, and watched over the flocks. She presided over childbirth, the young both of men and animals being her special care. The moon was a type of her, as the sun was of Phœbus. Perpetual virginity was her glory, and the fates of Orion and Actæon served as a warning to those who insulted her modesty. She was worshipped, however, under various aspects, some of them cruel and bloodthirsty. At Tauris (in the modern Crimea) human sacrifices were offered to her, as at Sparta, till Lycurgus substituted the flogging of boys on her altar. Her identity was, no doubt, mixed up with that of foreign deities. She was confounded with Isis, as Phœbus was with Osiris, and the Romans, to whom she was introduced through Magna Græcia, at once identified her with Diana.

Artemisia. 1. The great feast of Artemis, held yearly at Syracuse, in Sicily.

2. QUEEN OF HALICARNASSUS, who assisted Xerxes in his invasion of Greece (480 B.C.) and fought with such courage at Salamis that the Spartans erected a statue to her.

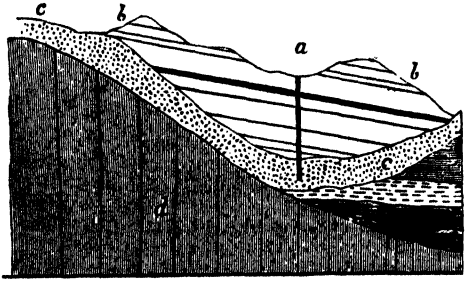
3. QUEEN OF CARIA in the fourth century B.C., the wife of Mausolus, to whose memory she erected the Mausoleum.

Artemisium, a promontory at the north-east end of the island of Eubœa, Greece, so called on account of the temple of Artemis that was erected there. Xerxes lost part of his fleet here in 480 B.C., partly through a storm, partly through the Greeks.

Arteries, the tubes through which the blood is carried from the heart to the various tissues. (BLOOD-VESSELS.) The branches of an artery are always smaller than the trunk from which they originate, the smallest arteries or arterioles finally breaking up into minute tubes of microscopic size called capillaries; the blood pumped by the heart through these fine channels is collected again into venules, and these venules combine with other venules to form veins. An artery is composed of three coats, an inner, middle, and outer. The inner coat is lined internally by a smooth layer of endothelium (q.v.), the middle coat consists largely of unstriped muscular tissue (MUSCLE), while in the outer coat elastic tissue predominates. The calibre of the arteries is controlled by the nervous system by means of nerves, called vasomotor nerves, which terminate in the muscle cells. Thus, in blushing a nervous impulse travelling down the vasomotor nerves of the arteries of the face causes relaxation of muscle cells with resulting increased calibre of arteries, and as a consequence more blood flows into the skin of the cheeks, which become flushed and hot. It is the contraction of the muscular coat of arteries after death which drives blood out of them and causes them to appear empty; hence arose

their name (artery signifying air-carrier), the ancients being unaware that the vessel during life was full of blood. The pressure of blood within the arteries is measured by means of the mercurial manometer; it is found that in the carotid of a rabbit this pressure is capable of supporting a column of mercury two or three inches high. The velocity of blood is greatest in the large arteries, and diminishes as the vessel divides and subdivides. The elastic element in the arterial walls serves to convert the intermittent action of the heart into a continuous flow in the capillaries and veins. Thus, if an artery be cut blood spurts out in jets, while in the case of a wounded vein the bleeding occurs in a uniform stream. Arteries are ligatured to check bleeding, as, for example, when a limb is amputated. Of the diseases to which they are subject the most important is atheroma (q.v.); they may also be occluded or plugged (EMBOLUS). Such bleeding from a wounded artery can almost always be controlled by firm pressure upon the heart-side of the bleeding point. The operation of opening an artery is known as *arteriotomy*.

Artesian Wells, named from Artois in Picardy, the first district in Europe in which they were made,



ARTESIAN WELL.
a, Artesian well; *b*, upper impermeable strata; *c*, porous bed; *d*, lower impermeable strata.

are wells which contain a column of water rising from a considerable depth owing to the beds through which they are pierced being bent in a syncline or basin. A porous bed between two impermeable ones will retain the water that falls as rain on its outcropping surface, and this water will stand, in any well sunk into the porous bed, at its level of saturation, or may actually rise above the surface-level of the well. Such wells have long been in use in China, and can be sunk round London, Southampton, Paris, and Vienna, but only where there is such a syncline. In the places named the porous bed is the Chalk. The famous fountains in Trafalgar Square, London, are fed by an artesian well 393 ft. deep.

Artevelde, (1) JACOB VAN, a wealthy brewer of Ghent, who in 1336 A.D. headed a revolt of the citizens against Louis de Nevers, Count of Flanders, and drove him out of the country with the aid of the English. Artevelde, with the authority of several cities, made a treaty acknowledging Edward III. lord-superior of Flanders, and the victory of the English fleet over the French at Sluys in 1340 confirmed this title. On the renewal of hostilities Artevelde tried to make the Black Prince Count of Flanders, but the people of Ghent resisted this, and murdered Artevelde (1344), and others of his party.

(2) PHILIP VAN, son of the preceding, took no part in public affairs until 1382, when his fellow citizens, having revolted against Count Louis II., invited him to take the supreme command. His first act was to avenge his father's death, and to drive Louis out of the country. Charles VI. of France now intervened and sent De Clisson into Flanders with an army. A battle occurred at Rosebeck; the Flemings were utterly defeated, and Philip, with some 30,000 of his followers, perished. His career forms the subject of a fine drama by Henry Taylor.

Arth, The starting point of Rigi railway, situated on the southern shore of Lake Zug, Switzerland.

Arthritis, inflammation of a joint. Thus, acute arthritis may be set up by injury; again, there is gouty arthritis, which affects by preference the joint of the big toe (GOUT), or tubercular arthritis, which in its most common form constitutes the "hip-joint disease" of children. In acute rheumatism one or more joints are inflamed, and the condition may be spoken of as rheumatic arthritis; this form of joint disease must not, however, be confused with chronic rheumatic arthritis. The last-named affection, which is also designated by the terms "rheumatoid arthritis," or "arthritis deformans," has nothing to do with acute rheumatism. It is, as a rule, chronic, and occurs during middle life, affecting the small joints. The articular cartilages are gradually worn away, and the exposed bony surface becomes polished, grooved, and hardened or "eburnated." Bony deposit also occurs in the tissues around the joint, and thus deformity results, hence the name. The course of rheumatoid arthritis is slow, but unfortunately it is not very amenable to treatment. Still something can be effected by regulating diet, by suitable exercise, by baths, and by the administration of certain remedies, such as guaiacum and iodide of potassium.

Arthrobranchs, those gills in such crustacea as the lobster which are situated just above the point of attachment of the appendages to the sides of the body.

Arthrogastra, a division of the ARACHNIDA including the ADELARTHROSOMATA and PEDIPALPI (*i.e.* "jointed limbs").

Arthropoda, the *phylum* (or division of the animal kingdom) which includes all animals with hollow-jointed appendages. The body is normally composed of a series of segments, usually more or less dissimilar, protected by a hard external skin. The phylum includes five classes, PYCNOGONIDA, CRUSTACEA, ARACHNIDA, PROTRACHEATA, MYRIAPODA, and INSECTA.

Arthrostraca, a division of CRUSTACEA with lateral sessile eyes, and usually seven distinct

thoracic limbs; it includes the orders AMPHIPODA and ISOPODA.

Arthur, a British prince who, according to various legends, made a gallant struggle against the Saxon invaders in the sixth century. It has been doubted whether there is the slightest substratum of fact in his story, but looking to the fictions that have attached themselves to such undoubtedly real personages as Charlemagne, The Cid, or even Napoleon I., we may, perhaps, assume that Arthur in some form or another did exist, and played a part in the obscure events that preceded the establishment of a Teutonic race in England. The record of Arthur's exploits cannot be traced farther back than Geoffrey of Monmouth's *Chronicle*, written in Latin about the middle of the twelfth century, and translated by Wace into French, and by Layamon into English. The materials were professedly gathered from old Breton traditions, and to these little by little additions were made until Sir Thomas Malory brought them all together in his *Morte d'Arthur*, which Caxton printed in 1485.

Arthur is said to have been the son of a Romanised Kelt, who, revolting against Vortigern, made for himself an independent principality in Hampshire and Wiltshire, but was killed at Amesbury by the Saxon invaders under Cerdic. Arthur, his son, held Camelot or Cadbury against the foe for years, fought several battles, the most important of which took place at Badon or Bath, and became the acknowledged head of the Britons. He was killed in a war with his nephew Modred, who had carried off his wife, and was buried at Glastonbury Abbey. According to more romantic accounts, Caerleon on the Usk was the seat of his court, where his chosen knights gathered about the Round Table, and sallied forth to redress wrong throughout the world. The faithlessness of Guinevere, his queen, with Lancelot his trusted friend; the weird existence of Merlin, and his ruin by the wily Vivien; the mystery of the sword Excalibur; the search for the Holy Grail, with many other episodes and adventures, ending in Arthur's passing away to the Isle of Avalon, belong to poetry rather than history, and have been worthily enshrined in Tennyson's *Idylls of the King*.

Arthur, CHESTER ALAN, President of the United States, born in 1830, early took a part in political life and became a prominent member of the Republican party. In 1871 he held the post of Collector of Customs for the port of New York. In 1880 he was elected Vice-President and succeeded Garfield as President on the death of the latter in 1881. He died in 1886.

Arthur, PRINCE, born in 1187, the son of Geoffrey the fourth son of Henry II. and Constance of Brittany. Thus Arthur's claim to the English throne was prior to that of John. He was at first supported by the king of France, but John succeeded in purchasing the latter's aid. John imprisoned the young prince, and is supposed to have finally procured his assassination in 1203.

Arthur's Seat, a hill just outside Edinburgh to N.E., having an elevation of 822 feet above sea-level. It consists of igneous rocks mixed with sedimentary strata of the Carboniferous period. The name is said to be derived by the familiar process of mythopœa from two Keltic words signifying "Hill of Arrows," the place having served as a range for archers, but the Arthurian legend has penetrated even farther north than this.

Artichoke, a name, probably of Arabic origin, applied to *Cynara Scolymus*, a thistle-like member of the order *Compositæ*, native to the Mediterranean region, the edible portion of which is the common

ARTICHOKE (*Cynara Scolymus*).

receptacle and the fleshy bases of the large imbricate bracts of the inflorescence. The Jerusalem Artichoke is the tuber of *Helianthus tuberosus*, a sunflower, introduced from the United States in the 17th century, but native to Mexico or Brazil. It gets its name from resembling the true artichoke in flavour, "Jerusalem" being a corruption of the Italian "girasole," the old English "turnsole."

Articles of Association, regulations for the management of a company formed and registered under the Companies Acts. They are such as the subscribers to the memorandum of association deem expedient, provided that they do not contravene such memorandum or otherwise infringe the provisions of the Act. They generally contain regulations as to calls, transfers of shares, general meetings, votes of members, powers of directors, etc., and are stamped as a deed. Each member is entitled to a copy on payment of one shilling. A precedent of regulations is given in Schedule A of the Companies Act, 1862.

Articles of Religion. The term implies that the separate propositions form one connected system (Latin *articulus*, joint). The THIRTY-NINE ARTICLES of the Anglican prayer book represent the *forty-two articles* drafted by Archbishop Cranmer, considered by Convocation and approved by the Crown in 1553. (Ten articles had already been similarly adopted in 1536.) These forty-two, suppressed during Mary's reign, were revised by Convocation and re-enacted in 1553. They contain statements of the religious doctrine and practice of the Church of England, and bear frequent

traces of the religious controversies of the period. Every clergyman is required by law to sign them at his ordination, and at his admission to any benefice, as also to read them publicly on the latter occasion in the church ("reading himself in"). The question whether subscription implies belief in the articles, or merely an engagement not to controvert them, has been often disputed. Dr. Johnson and many High Church clergy have held the latter.

Articles of the Peace, a complaint made or exhibited to a court by a person who makes oath that he is in fear of death or bodily harm from some one who has threatened or attempted to do him injury. The court may thereupon order the person complained of to find sureties for the peace, and in default may commit him to prison. Articles may be exhibited in the King's Bench (High Court), or to any Justice of the Peace.

Articles of War, a code of rules for the government of the army and navy, which are now in Great Britain embodied in the Army Act. They enumerate all punishable offences in the services, with the penalties attaching to each. The Act is now known as the Army Annual Act. [ARMY.]

Articles, THE SIX, statements of doctrine passed in 1539 by Henry VIII. They were as follows: (1) The doctrine of transubstantiation; (2) "That communion of both kinds is not necessary *ad salutem*;" (3) That priests may not marry; (4) That vows of celibacy are to be observed; (5) That private masses be admitted; (6) That auricular confession be allowed. The Act of the Six Articles (known as the "whip with six strings"), after setting forth these doctrines, enacted severe penalties on offenders against them. It was repealed in 1547.

Articulata, (1) one of the four great divisions made by Cuvier of the animal kingdom; it included the ARTHROPODA and VERMES. (2) The order of BRACHIOPODA, in which the valves of the shell are attached to one another by a hinge and teeth; it includes the great majority of the class. (3) A term once used in the subdivision of the orders of the BRYOZOA.

Artificers. A specific branch of rated men and petty officers in the British Navy. Composed of engineers, smiths, armourers, shipwrights, and other skilled men, who after entering the service have displayed good conduct and efficiency.

Artificial Limbs. Contrivances designed to replace lost or injured limbs are of great antiquity, mention being made of them in Herodotus and Pliny. [*Also see* CORK LEG, BEAUFORT ARM, etc.]

Artificial Respiration. As the result of the action of certain poisons, or owing to some mechanical obstruction in the air passages, the movements of respiration may cease while the heart still continues to beat. Under such circumstances the prompt performance of artificial respiration is imperatively called for, and in no inconsiderable number of cases it is effectual in restoring the patient to life. After the heart has actually ceased beating, it is doubtful whether artificial respiration can restore animation. Still it should be resorted to, in the hope that it may prove of service. The best method of artificially filling and emptying the lungs of air is that of Sylvester. The patient is laid on his back, his shoulders raised by means of a pillow or cushion, and his tongue drawn forwards. The chest is then alternately expanded and compressed so as to imitate inspiration and expiration respectively. The operator stands behind the patient's head grasping the two arms with his hands. He first extends the arms over the head producing expansion of the chest, and then brings the two elbows of the patient right down to the side of the chest on each side, exercising firm pressure so as to constrict the thoracic cavity and drive air out of it. These movements must be regularly performed in such a manner that about fifteen complete artificial respirations are effected in a minute. In the excitement attendant upon the cessation of respiration, whether the case be one of drowning or poisoning, the mistake which is sometimes made is to perform the movements too rapidly. The normal rate of breathing should be imitated, and thus 15 to 20 respirations a minute are quite sufficient. In cases of drowning it is well as a preliminary measure to turn the body face downwards, and raise the feet, so as to allow water to escape from the mouth; and while the various measures for restoring animation are being adopted, it is most necessary to maintain the temperature by removing wet clothes, drying the skin, and if possible procuring warm blankets to protect the body.

Artillery, ROYAL, REGIMENT OF, the name given to the whole of the British artillery. It was first formed in 1715, but has since grown enormously, and is now subdivided into *Horse*, *Field*, and *Garrison Artillery*. *The Honourable Artillery Company*, now belonging to the Territorial Army, was formed as a Volunteer force in the 16th century.

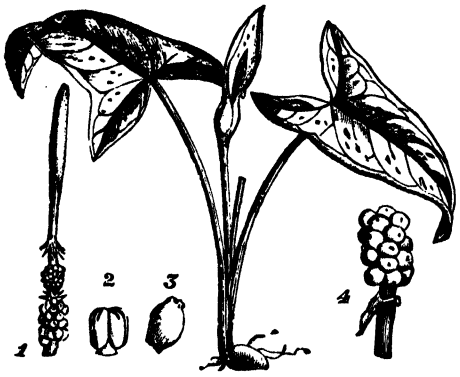
Artillery. [GUNS.]

Artiodactyla, a section of Ungulata (q.v.), containing those in which the number of toes is even—two or four—and the third digit on each limb forms a symmetrical pair with the fourth. The two-toed Artiodactyla comprise the ruminants and the pigs; the only living four-toed members of the section are the hippopotami.

Artois, an ancient province of France, which comprised the modern department of Pas de Calais, with part of the Somme and the Nord. Louis IX. made it into a county for his brother Robert in 1237. In 1384 it went by marriage to the Dukes of Burgundy, and from them to Austria in 1477. It was reconquered by France in 1640, and this conquest was confirmed in 1678. The capital was Arras, which is now the chief town of Pas de Calais.

Arum, a genus of monocotyledonous herbaceous perennials, giving its name to an important order. They have starchy corms or rhizomes, smooth, radical, sagittate leaves with netted veins and an inflorescence consisting of an unbranched monœcious *spadix* in a sheathing *spathe*. The spadix bears one-chambered ovaries, anthers with porous dehiscence and rudimentary ovaries, none of these

flowers having any perianth, and terminates in a naked club-shaped *appendix*. The temperature within the unopened spathe rises considerably.



ARUM MACULATUM.
1, Spadix; 2, stamen; 3, ovary; 4, fruit.

Like most of the order, the genus is acridly poisonous. The common British species (*A. maculatum*) is termed Cuckoo-pint, or Lords-and-ladies.

Arundel, an ancient town in the county of Sussex, 50 miles from London, and situated on the river Arun, from which it takes its name. The castle dates from Saxon times, and was a strong place capable of offering a stubborn resistance to Henry I. when he besieged Montgomery, Earl of Arundel, there. It has been in the possession of the Howard family (Duke of Norfolk) since the middle of the 15th century, and is kept up with great magnificence. The fine cruciform parish church dates from the 14th century. There is a shipping trade in corn and oil, the Arun being navigable. Pop. (1901), 2,738.

Arundel, THOMAS, Archbishop of Canterbury, son of Richard Fitz-Allan, Earl of Arundel, born in 1353, was made Bishop of Ely at the age of 22, then Archbishop of Canterbury, and finally Primate in 1396. He was banished for a short time owing to his complicity in Gloucester's intrigues, but returning in 1399 took a very active part in suppressing the Lollards. He died in 1413.

Arundel of Wardour, LADY BLANCHE, defended Wardour Castle most courageously against the Parliamentary forces under Hungerford and Ludlow, but surrendered on honourable terms. These the besiegers violated, and her husband blew up the structure.

Arundelian Marbles. A collection of ancient Greek sculptures from Smyrna and elsewhere, originally formed by Thomas Howard, Earl of Arundel, and presented to the University of Oxford in 1667 by his grandson, Henry Howard, afterwards Duke of Norfolk. The most important is the Marmor Parium, a chronological table of Greek history on Parian marble, originally extending from 1582 to 263 B C. The chronicle of the last ninety years is lost, and the extant portion of the table is now much defaced and mutilated. It seems to have been originally drawn up by a schoolmaster for his pupils' use. A variorum edition of the inscriptions was issued by Maittaire in 1732, and another by Chandler in 1763.

Aruwimi, a large tributary of the Congo, Equatorial Africa, which it enters some distance below the Stanley Falls and above Upoto. It was by the Aruwimi that Stanley proceeded in his 1887 expedition.

Arval Brothers (Lat. *fratres arvales*), in ancient Rome, a college of members who annually performed public sacrifices that the fields might prove fertile. They were twelve in number, and were of the highest rank.

Arve, a river of Switzerland, which, rising in the Col de Balme, is joined by its tributary, the Arveyron, and flows through Chamounix to the Rhone.

Arvicola. [FIELD MOUSE. VOLE.]

Aryans, or INDO-EUROPEANS, the largest, most widespread, and most highly-cultured division of the Caucasic family of mankind, extending from prehistoric times almost continuously across a great part of the eastern hemisphere from India to Scandinavia and the British Isles, and since the discovery of the New World widely spread throughout America, South Africa, and Australasia. There are two distinct types: (1) the *Xanthochroi*, or *Fair*, tall, with flaxen or light brown wavy hair, blue eyes, florid complexion, dolichocephalic head, large straight nose, orthognathous jaw, low cheek-bone; (2) the *Melanochroi*, or *Dark*, short or medium stature, with black or dark brown straight or curly hair, black or brown eyes, pale complexion inclining to sallow, small hands and feet. The fair is probably the primitive Aryan stock, the dark the non-Aryan peoples, on whom the first imposed their language and culture, and with whom they became almost everywhere intermingled. Hence the presence of both types now constantly observed in every part of the Aryan world, and even within every special group, and in the family circle itself. But speaking generally, the fair predominates mainly amongst the Scandinavians and other Northern Europeans, the dark elsewhere in Europe and throughout south-west Asia. The question of the original home of the primitive Aryans has in recent times been much discussed, the prevailing opinion hitherto locating them in south-west Asia, the Iranian plateau, or even the Pamir. But lately the view first put forward by Latham that the cradle of the race is to be sought in Europe has gained strength, and is now accepted as almost demonstrated by Penka, Canon Isaac Taylor, Professor G. H. Rendall, Poesche, and especially Dr. O. Schrader. In his *Prehistoric Antiquities of the Aryan Peoples* (English edition by F. B. Jevons, 1890), this writer follows Leskien in fixing the south-west Russian Steppes as the region where the Aryan nomads first tended their flocks, and whence they spread eastwards to Asia, and by the Volga, Don, and Danube throughout North and Central Europe. In some places the migratory tribes

were the first occupiers of the land, and were thus able to preserve the purity of their race for many ages. Elsewhere they found the land already more or less thickly peopled by other races, with whom they became amalgamated, thus producing the above-described mixed types. But in Europe they ultimately imposed their Aryan speech everywhere except in the north-east (Finnic domain) and in the south-west (Iberian domain, still represented by the Basques of the Western Pyrenees). Hence Europe is now almost exclusively Aryan. In Asia their domain has been largely encroached upon during the historic period, especially by the Túrki peoples, by whom they have been driven out or nearly absorbed in Anatolia and many parts of the Iranian plateau. The theory that the primitive Aryans were a cultured people, with an elaborate religion and mythology, is now exploded. Before the dispersion they appear to have been rude pastoral and agricultural nomads at a low stage of culture, practising a few simple industries, with probably a shamanistic form of religion, worshipping the spirits dwelling in the heavenly bodies, in the thunder-cloud, in the forests, mountains, fire, and water. At that period the difference was perhaps not great between them and the surrounding peoples; and their later upward evolution, placing them at the head of the intellectual and political world, was mainly due to their more favourable environment in the temperate climate, fertile lands, and diversified seaboard of the Mediterranean regions. On the whole the Aryans must be regarded not as a single race, but as an amalgam of many Caucasic and, no doubt, some Mongolic peoples, leavened by an original Aryan element, and endowed with a certain racial uniformity by the immense predominance of the Caucasic physical characteristics and by general adoption of Aryan speech, traditions, and usages. Wherever located the original element is certainly of vast antiquity, appearing as a distinct ethnical group probably at the close of the last glacial epoch. The process of amalgamation resulting in the historic Aryan peoples had its beginning with the first contact of the migrating tribes with alien races after the dispersion from a common centre, and this process has never ceased throughout historic times. It is now developing new and often profoundly modified Aryan groups in North America (Franco-Canadian half-breeds), throughout Spanish and Portuguese America (Mestizos), in Indo-China (Franco-Anamese), in North Russia and Siberia (Russo-Ugrians), and in other places. But as a rule the Anglo-Saxon or British Aryans, who are by far the most numerous and widespread out of Europe, do not amalgamate with the aborigines. Hence Anglo-American, Anglo-African, or Anglo-Australian half-castes are rare, and the modifications of the Aryan types undoubtedly going on in the "Greater Britain" beyond the seas are due, not to miscegenation, but to the changed environment.

Aryan, or INDO-EUROPEAN, LANGUAGES form collectively the largest and most highly developed division of the inflecting order of speech, of which the other chief divisions are the *Semitic* and the *Hamitic*. Their range is far more extensive than that of the Aryan peoples themselves, for they are spoken by many millions of the American aborigines, by all the African negroes in the New World by many Russified Ugrian Finns, and by the natives in various parts of the British colonies. All descend directly, but in various divergent lines, from a primitive Aryan tongue long extinct past recovery, and all attempts at the restoration of which have proved abortive. The divergent lines, eight in number, represent each a separate branch of the primitive stock, and the divergence began at such a remote epoch that the mother tongues of each of these branches have also been long extinct past recovery. Thus we have eight distinct linguistic groups (*Indic* and *Iranic* in Asia, *Thraco-Hellenic*, *Italic Keltic*, *Slavonic*, *Lithuanic*, and *Teutonic* in Europe), the earliest forms of which are already so profoundly differentiated from each other that their common relationship alone can be demonstrated, the order of their divergence from the parent stem, or from some now lost intermediate stems, remaining more or less conjectural. Each group comprises two or more subdivisions, which again throw off numerous branches, the whole forming an extremely complex system, which will be best understood by the subjoined

TABLE OF THE ARYAN LINGUISTIC FAMILY.

Groups.

1. INDIC — Vedic (Early Sanscrit) / Later Sanscrit → The Prakrits (Vulgar Sanscrit) → Neo-Sanscrit: Kashmiri. Panjábi. Gujaráti. Marathi. Hindi. Bengali. Oriya. Assami.

2. IRANIC — Eastern Branch; Western Branch: Zend, Pushtu (Afghan), Galcha. Old Persian, Pahlavi, Neo-Persian, Kurdish, Baluchi. Haik Branch: Old and Modern Armenian, Ossetian.

3. THRACO-HELLENIC — Thracian (extinct), Illyrian (extinct), Albanian. Pelasgic (extinct), Æolian, Dorian → Ionian: Attic. Byzantine. Romaic (Modern Greek).

4. ITALIC — Oscan, Sabine, Umbrian: Extinct. Latin, Vulgar Latin, Neo-Latin: Italian. Langue d'Oc (South French). Langue d'Oil (North French). Spanish. Portuguese. Rumanian. Romansch.

5. KELTIC — Gaedhelic: Irish, Gælic, Manx. Kymric: Kymraeg (Welsh), Cornish (extinct), Breton.

6. LITHUANIC: Lithuanian, Lettic, Pruczi (Prussian, extinct).

7. SLAVIC — Eastern Branch: Church Slavonic, Bulgarian, Great and Little Russian, Servo-Croatian, Slovenian. Western Branch: Bohemian, Slovak, Polish, Polabish (Czekh), Lusatian. (extinct)

8. TEUTONIC — Low German Branch: Gothic, Frisic, Continental Saxon, Anglo-Saxon, English, Lowland Scotch. Norse Branch: Old Norse, Icelandic, Danish, Norwegian, Swedish. HighGerman Branch: Old, Middle and New High German, Rhenish, Thuringian, Swiss, Suabian.

The profound disintegration which is shown in this table, and which is far greater than in the Semitic family, is mainly due to the spread of Aryan speech amongst non-Aryan peoples, by whom its phonetic system and grammatical structure were diversely modified. Apart from these potent outward influences, all the Aryan tongues have throughout their historic life betrayed an inner tendency to break up the highly developed inflectional forms of the early languages, such as Sanskrit, Zend, Greek, and Latin, and thus continue their natural evolution in the direction from synthesis towards analysis. Thus the Romance or Neo-Latin gradually rejected all case-endings and passive verbal forms, and the Latin *amabor*, for instance, is expressed by three words in Italian and French: *io sarò amato; je serai aimé*. It would require four in English (*I shall be loved*), and in this respect English is the most highly developed—that is, the most analytical of all Aryan languages, having retained scarcely a dozen of the many hundred inflections characteristic of primitive Aryan speech. At the opposite pole stands the Lithuanian, which is the most synthetic—that is, retains more of the original inflectional system than any other living Aryan language. On this fact was built Latham's theory that the primeval home of the Aryan peoples may have been situated somewhere about the S.E. shores of the Baltic Sea.

Arzamass, or ARSAMASS, a town in the government of Nijni-Novgorod, Russia, on a tributary of the Volga. Two fairs are held there yearly, considerable business being done in sheep-skins and sail-cloth. There are also iron-foundries, dye-works, and factories for soap and leather.

Arzew (anc. *Arsenaria*?), a seaport in Algeria, 26 miles from Oran. It exports a large quantity of grains, and has salt-works. Many Roman remains are found in the neighbourhood.

As, a weight of 12 ounces, the same as a pound or *libra*, in use in ancient Rome. It was divided into 12 ounces or *unciæ*. The coin is said to have weighed 12 ounces in the time of Tullus Hostilius (q.v.), but it was eventually reduced to only half an ounce. It was stamped with the two-faced Janus on one side and with a ship's prow on the other.

Asafœtida, a fetid gum-resin produced by *Ferula Narthex*, *F. Scorodosma*, and allied species, natives of Persia and Afghanistan, belonging to the order *Umbelliferæ*, used in Indian cookery, and reputed to have stimulant properties.

Asaph, a Hebrew musician of the tribe of Levi, who was a contemporary of David, and either composed or set to music several Psalms (1 Chron. xvi. 5).

Asaph, ST., a town in Flintshire, North Wales, 20 miles from Chester. The name of the place was originally Llan-Elvy, but a British saint, who was abbot of the monastery, and perhaps bishop, in the sixth century, changed its appellation. It has been for about 800 years the seat of a bishopric, and possesses a handsome episcopal palace. The cathedral is a plain structure (1472–1495), and was restored in 1875. Pop. (1901), 6,170.

Asaphidæ, a family of Upper Cambrian and Silurian TRILOBITES of which *Asaphus* is the type genus.

Asarabacca, *Asarum europæum*, a British representative of the *Aristolochiaceæ*, with broadly

ASARABACCA.
1, Flower, with one segment of calyx removed; 2, ovary; 3, section of ditto; 4, stamen.

kidney-shaped leaves and brown flowers, formerly in repute among herbalists as an emetic.

Asbestos (Greek, *unconsumable*), a fibrous form of hornblende, a silicate of magnesium, aluminium and iron; white, grey, or green in colour, with a silky lustre, in flexible threads, sometimes over a yard long. It is not fused by ordinary flame, and has been woven into fireproof fabrics; but is now mainly used for packing pistons, fireproof safes, and steam-pipes, and for gas-stoves. It is found in serpentine, in Anglesea and Cornwall; but the finer longer form, known as *Amianthus*, is obtained from the Alps, Pyrenees, Urals, New South Wales, etc. *Mountain leather*, *mountain cork*, and *mountain wood* are brown, felted varieties.

Asbjornsen, PETER CHRISTIAN, a Danish zoologist and investigator of folk-lore, was born in 1812. He was so poor that he was long in graduating at the University of Christiania. He worked in conjunction with Pastor Jorgen Moe amongst the peasantry, collecting tales and legends, which were published in 1838–42–45, and met with great success. He next devoted himself to marine zoology, and made valuable discoveries. In 1850 he became forest inspector, and much advanced the peat industry. He retired in 1876, and published a complete and illustrated edition of the *Norske Folke-og Huldre-Eventyr* in 1879. He also wrote many original stories for children in the style of Hans Christian Andersen. He died in 1885.

Asbury, FRANCIS, born in Staffordshire in 1745. He came under the influence of John Wesley who sent him to North America as a missionary in 1770. He became in 1784 first bishop of the newly organised Methodist Church in the United States and died in Virginia in 1816.

Ascaris, and especially *A. lumbricoides*, the common round worm, a convenient type of NEMATODA. It has a cylindrical body tapering at both ends; at the anterior is the small head with a triangular mouth. This leads to a muscular œsophagus, continued backwards as a wide tube; the

opens at the anus slightly in front of the posterior end of the body. The nervous system consists of a ring round the mouth, and six cords running back through the body. There is neither heart nor vascular system. The full course of development is unknown. The ova are expelled from the body, and after being hatched the embryos gain admittance to the alimentary canal of their future host. They usually remain in the small intestine, but they may enter the stomach and escape through the mouth or perforate the walls of the intestine and even of the abdomen, and cause abscesses. The female is ten to fourteen inches, and the male four to six inches long. The *Ascaris lumbricoides* is one of the commonest internal parasites in man. Children are more commonly affected than adults, but it is uncertain in what manner the worm is originally introduced into the alimentary canal. The female worm produces a large number of eggs, but these do not develop in the human body, indeed, as a rule, there is no suspicion that anything is wrong with the child that harbours an ascaris, until the worm is expelled. All sorts of symptoms have been ascribed to the presence of *ascarides*, but as far as the round worm is concerned these are most unreliable. As a rule the *ascaris* occurs singly, but in some cases a large number may be present and may call for the administration of vermifuge remedies. Of these santonin is the drug recommended for the expulsion of round worms.

Ascension, a small volcanic island in the Atlantic (lat. 7° 55′ N., long. 14° 25′ W.), 760 miles north-west of St. Helena, 960 miles from Africa, and belonging to Great Britain. It owes its name to the fact that it was discovered by John de Nova on Ascension Day, 1502. It was occupied by the British when Napoleon was sent to St. Helena in 1815, and has since served as a coaling station and victualling place for the navy, and as a sanatorium for invalids from the west coast of Africa. Its length is eight miles, and its average breadth six miles, and the central peak rises to a height of 2,870 feet. Scarcely a blade of verdure exists save on Green Mountain and in the gardens kept up by the small staff of officials, sailors, and marines, but pepper and castor-oil trees, tomatoes, and Cape gooseberries are said to be indigenous. Turtles are plentiful, and deposit their eggs on the shore, as do myriads of sea birds. The commandant, a naval officer appointed by the Admiralty, has absolute authority as on board a man-of-war. Georgetown is the name of the little settlement. Pop., 266.

Ascension Day, sometimes called *Holy Thursday*, the fortieth day after Easter, on which is commemorated by the Church the ascension of Christ into heaven.

Ascension, RIGHT, one of the arcs required to express the position of a heavenly body in the celestial sphere. It corresponds to the longitude of a place on the earth's surface, and with a knowledge of the declination, which corresponds to latitude, the exact position of the body is determinate. Just as terrestrial longitude requires some fixed meridian, such as that through Greenwich, as a standard from which to measure the position of other meridians, so must there be a fixed declination circle or meridian in the heavens, from which the right ascension of any star shall be measured. The point on the celestial equator through which this standard declination circle passes is known as the first point in Aries. Right ascension may be expressed as an angle in degrees, minutes, and seconds, or as the sidereal time taken for the object to culminate, reckoned from the instant the first point in Aries traverses the meridian. [DECLINATION.]

Ascetic (Gk. *askēsis*, exercise). A term properly signifying one who is in training for a race, and therefore abstains from certain foods, etc. It was adopted by the early Christians to signify abstinence from food, wine, marriage, etc., in order to "mortify the flesh" and lead a stricter spiritual life. [HERMIT.] Monastic orders (*e.g.* the Trappists and Carthusians) have often practised asceticism, such as abstinence from animal food or even from ordinary conversation. The word is now applied loosely to all devotees who voluntarily undergo bodily suffering, either to gain the favour of a Divine Being or Beings, or (more frequently) to free themselves from the temptations of the flesh. [BUDDHISM.]

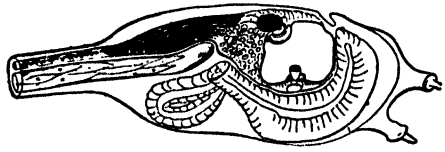
Aschaffenburg (anc. *Hercynia*), a fortified town in the district of Unterfranken, Bavaria, Germany, on the river Main, 24 miles from Frankfort. The cathedral, a fine building, dates from the tenth, and the Castle of Johannesberg from the seventeenth century. There are a Lyceum, royal library, Capuchin monastery, and a Catholic foundation called the "Insignis Collegiata," or "Stiftskirche." Some shipbuilding is carried on, and there are manufactories of paper, woollens, straw-plaiting, and tobacco. It has a station on the Bavarian State Railway.

Ascham, ROGER, was born at Kirkby Wiske in Yorkshire in 1515 A.D. At St. John's College, Cambridge, he took to Greek and Lutheranism, but in spite of these drawbacks got a fellowship, became public orator, and was appointed tutor first to Prince Edward and then to Princess Elizabeth. In 1544 he wrote his *Toxophilus the Schoolmaster, or Partitions of Shooting*, a curious and interesting treatise on the history and practice of archery. He spent three years in Germany (1550–2) as secretary to the English Ambassador at the court of Charles V., and returned to act as Latin secretary to King Edward, on whose death he contrived to keep his post under Mary, and at the accession of Elizabeth became reader to the Queen as well. Though his life was thus spent at Court he appears to have preserved an independent spirit, never soliciting favours. However, he received a prebendary stall in York Cathedral in 1559. Four years later he wrote his *Schoolmaster*, in which he explained his educational method—summed up in the words *docendo discos*. The work was not published till after his death. His health began to fail when he was fifty, and it is stated that he impaired his fortune by gambling and cock-fighting. He died of ague in 1568, to the genuine grief of Elizabeth.

Aschersleben, a town in the district of Magdeburg, Prussia, between the rivers Eine and Wipper. The ruins of Ascania, the ancestral seat of the Anhalt family, are not far distant. Friezes, flannels, and sugar are made here.

Ascidiacea, the order of TUNICATA, including the sessile and the compound free-swimming forms. It includes three sub-orders, the ascidiæ simplices, compositæ, and salpæformes.

Ascidian, the Sea Squirt, is a good type of the class VIROCHORDA, the lowest division of the great phyllum CHORDATA. The body is sac-like, and consists of two tunics perforated by a mouth and an "atrial pore." The former leads to a large pharynx or branchial sac; this is lined by a network of longitudinal and transverse vessels. This network is respiratory in function, as water can pass through the pores (stigmata) between the



ASCIDIAN (showing internal organs).

vessels to the atrium; this is a cavity that nearly surrounds the pharynx, and it communicates to the exterior by the atrial pore. The alimentary system consists of an œsophagus leading from the pharynx to the stomach and intestine; the latter opens to the atrium. The single nerve ganglion is between the mouth and atrial pore, and beneath it a ciliated groove, the endostyle (q.v.), runs along the ventral edge of the pharynx; it is the relation of the nerve system and endostyle that gives the ascidian its vertebrate affinities. This is especially well shown in the embryo and such forms as APPENDICULARIA.

Ascidiozooid, one of the separate individuals of a compound ASCIDIAN.

Ascites, the condition in which a collection of fluid is formed in the peritoneal cavity. Ascites may form part of a general dropsy [DROPSY] or it may exist by itself. In the latter case it is due either to disease of the peritoneum (inflammation or morbid growth), or to obstruction to the portal circulation, the most common cause of which is cirrhosis of the liver (q.v.). Ascites may be simulated by several other conditions, from which it has to be distinguished by careful examination. The amount of fluid which collects may in extreme cases amount to several gallons; the pressure exerted in such a condition gives rise to numerous distressing symptoms, the most noteworthy of which is shortness of breath. To relieve such a state of things the peritoneal cavity is tapped, that is to say, the operation of *paracentesis abdominis* is performed.

Asclepiades, an eminent Greek physician settled at Rome in Cicero's time. His leading doctrine (possibly derived from Epicurus) was that all disease was due to an inharmonious distribution of the atoms composing the body. He is said to have invented laryngotomy, and to have first distinguished acute and chronic disease. Fragments of his writings are preserved.

Ascoceratidæ, a family of NAUTILOIDEA, in which the body chamber occupies most of the ventral side of the sac-like, truncated shell. It occurs in the Silurian rocks of Europe and America. *Ascoceras* is the type genus.

Ascoli (Lat. *Asculum Picenum*), a town in the province of Ascoli Piceno, Italy, standing on the river Tronto, 15 miles from Teramo and 90 miles north-east of Rome. It occupies a strong position in a difficult country. It is the seat of a bishopric and contains a citadel, a cathedral, and the remains of an amphitheatre, with other Roman buildings There is in the Capitanata another town of the name Ascoli di Satriano, the ancient Asculum Apulum, the scene of the victory of Pyrrhus 279 B.C.

Ascomycetes, an important group of the higher fungi, characterised by producing spores generally eight together, in club-shaped cells known as *asci*. These asci are borne either in open cup-like *apothecia* or in nearly-closed receptacles termed *perithecia*, the presence of these structures distinguishing the subdivisions *Discomycetes* and *Pyrenomycetes* respectively. *Peziza* is a type of the former; ergot (*Claviceps*) of the latter. Some of the lichens belong to each subdivision.

Asconidæ, a family of calcareous sponges.

Ascot, a heath in Berkshire lying just beyond the confines of Windsor park. Races were instituted here in 1711 by Queen Anne, and the meeting is still one of the most popular and fashionable of the summer season, being held a fortnight after the Derby. A large population has sprung up recently in the neighbourhood, owing to the dry, healthy climate and picturesque surroundings.

Ascus, from the Greek *askŏs*, a leather bottle, the sporangium of the Ascomycetes (q.v.).

Asellio, or ASELLI, GASPARO, born in 1581, was a physician of Cremona, and afterwards professor of anatomy at Pavia. In vivisecting a dog his attention was called to the existence of the lacteal vessels, on which he wrote a treatise published in 1627, a year after his death.

Asellus, the Water Slaters, a genus of fresh-water ISOPODA.

Æses, the gods in Scandinavian mythology.

Asexual Reproduction, that which is not the result of sexual intercourse; it is the same as AGAMOGENESIS.

Asgard, in Scandinavian mythology, the place where the gods dwelt.

Asgill, JOHN, an eccentric personage, the date of whose birth is uncertain. He was called to the bar and in 1698 published two pamphlets on currency and registration of titles to land, in which he anticipates modern views in a remarkable manner. His next effort was directed to prove

that physical death was due to want of faith, and he asserted that he should be translated to heaven without going through that unpleasant process. Going to Ireland he obtained practice, made some money, and married a daughter of Lord Kenmare. He was not allowed—though elected—to sit in the Irish Parliament, because his book was said to be blasphemous. He did take his seat for Bramber in the British House of Commons, but was afterwards expelled on the same ground. Being over head and ears in debt, he retired to the King's Bench, then to the Mint, and lastly to the Fleet, where he spent thirty years writing pamphlets in apparent happiness. He died in 1788 at a very great age.

Ash, the mineral residuum which is left when any organic substance is burnt with free access of air. The amount of ash thus obtained varies within very wide limits; in bone it may amount to 75 per cent. Phosphate of calcium, alkaline, chlorides, and carbonates, silica, and sesquioxide of iron are all characteristic ash-constituents.

Ash (*Fraxinus excelsior*), a valuable British timber-tree belonging to the olive tribe. It has smooth, olive-grey bark, black buds, opposite pinnate leaves of from seven to fifteen leaflets, flowers

ASH (*Fraxinus excelsior*), showing leaf, buds, and fruit.

without calyx or corolla, and an oblong-winged fruit. Its wood is more flexible than that of any other European tree, and is used for walking-sticks, spade-handles, the spokes and felloes of wheels, etc., though now largely superseded by the allied American *F. americana.*

Ashantee, or ASHANTI, a country in West Africa lying inland of the Gold Coast, and extending over some 70,000 square miles. Dense forests cover most of its surface, but round the villages clearings are made and abundant crops raised. The Assinie and the Volta are the two chief rivers, and alluvial gold is found in their beds. Polygamy is practised. Coomassie is the capital. From the early part of the 19th century the British have frequently come into collision with the Ashantis. In 1873 the disputes arising out of the cession of the Dutch forts to the English Government reached such a head that Sir Garnet Wolseley was sent out with a large force. He penetrated to Coomassie, burned the town, and forced King Koffee to conclude a treaty and to pay an indemnity. Hostilities were threatened again in 1881, but happily averted. In 1896 Ashantee was placed under British protection, and in 1901 the country was definitely annexed by Great Britain, the Governor of the Gold Coast being appointed Governor of Ashantee. In 1900 disturbances again arose, and Coomassie was invested by rebel tribes, but was relieved, and the rising was quelled. The *Ashantis* belong to the same *Tshi* or *Otsi* family which also comprises the Wassaws, Tshiforos (Tufels), Safwhis, Gamans, Assins, Adansis, Akims, Akwapims, and others, collectively forming a distinct West African group, essentially forest people, of the true negro type, and speaking various dialects of the Tshi language. Traditionally the Ashanti came from *Intu,* an unknown region of the Sudan, and are by some writers described not as negroes, but as a very fine race tall, well made, with aquiline nose, and quite regular features. But this description applies only to the ruling class, probably Hamitic intruders from the north, who now constitute the hereditary aristocracy, and who have adopted the Negro Tshi language. Fetishism is an essential element of their religion, of which a chief feature is ancestry worship associated with human sacrifices. Hence the sanguinary "customs" at which hundreds of victims were immolated at the graves of departed kings and nobles. Since the British occupation these rites have ceased.

Ashburton, ALEXANDER BARING, BARON, was born in 1774, being the son of Sir Francis Baring, a wealthy London merchant and financier, of German extraction. He succeeded to the baronetcy and headship of the firm in 1810, and entered Parliament as a Whig, but at the passing of the Reform Bill he became a moderate Conservative. In 1834 he joined Peel's ministry as president of the Board of Trade, and on retiring from office next year was made a peer. In 1841 he was sent to America to settle boundary disputes with the United States, and concluded the Ashburton Treaty. He abandoned Peel when that minister changed his views as to the corn-laws, and after the repeal he took no active part in politics. He died in 1848.

Ashby-de-la-Zouch, a small market town in Leicestershire, 17 miles W. of Leicester on the Midland Railway. The name is derived from the Norman family of La Zouch. The scene of some of the most important incidents in *Ivanhoe* is laid here, and the ruins of Ashby Castle, where Mary Queen of Scots was immured, stand south of the town. The church of St. Helen is a fine structure and contains interesting monuments. The principal

manufacture is leather, but there are iron-smelting works, and factories for nail-making and hosiery. Pop. (1901), 4,722.

Ashdod (in N. T. *Azotus*), on the Mediterranean, 21 miles S. of Jaffa, once a strongly fortified city of the Philistines, and the seat of the worship of Dagon (Cp. 1 Sam. iii.). It was taken by the Assyrians 715 B.C., by the Egyptians in the next century, and destroyed by the Maccabees. It was rebuilt by the Romans, but is now a poor village.

Ashehoh, a city in the province of Kirin, Central Manchuria, China. It is 30 miles S. of the river Soongari, and is the second city in the province, enjoying a considerable local trade.

Ashen Keys, a name sometimes given to the dry, flat seed-vessels of the ash. When represented in heraldry they are known by this name.

Ashen Pearl Shell (*Pisidium cinerium*), a small bivalved shell common in English fresh waters.

Asherah, a Hebrew word, incorrectly translated "grove" in the Authorised Version of the Bible, but simply transliterated in the Revised Version. According to Prof. W. Robertson Smith, the Asherah must have been either a living tree or a tree-like post, and in all probability either form was originally admissible. It was undoubtedly an object of worship, and the prophets classed it with other sacred symbols (Isa. xvii. 8; Mic. v. 12, 13). He rejects the notion that there was a Canaanitish goddess of this name, and holds that in early times tree-worship prevailed to such an extent in Canaan that the sacred tree, or a pole representing it, was viewed as a symbol of Deity which might fittingly stand beside the altar of any god.

Ashford. (1) A market town in Kent, 53 miles from London, on the river Stour. Since it has become a junction on the South-Eastern Railway for the lines to Ramsgate, Dover, and Hastings, the place has grown in importance, and the works of the company employ a large number of men. There is a handsome Gothic church and an old Grammar School. The cattle market is one of the largest in the county. Pop. (1901), 12,808. (2) A town in Middlesex, 17 miles from London, and two miles from Staines, on the London and South-Western Railway.

Ashlar (Low Latin, *axillaris*, plank-like, *i.e.* laid in courses), building stone squared and hewn (sometimes only applied to squared stone), in contrast to rubble and rough undressed stone. It is laid in regular courses, and classed as *tooled*, *polished*, or *rustic* ashlar, according as the face of the stone is worked or left smooth or rough.

Ashley, JOHN, a musician of some note in the 18th century. It was under his management that Haydn's *Creation* was first performed in England.

Ashley, LORD. [SHAFTESBURY.]

Ashmole, ELIAS, astrologer, alchemist, and antiquary (1617–1692). Tradescant, in whose house at Lambeth he lodged, bequeathed him his museum, which Ashmole presented, together with his library, to the University of Oxford, where it still bears his name. He was made an honorary M.D. of the University in 1690. His chief works are *Theatrum Chemicum*, 1652; *Institutions of the Order of the Garter*, 1672; *Diary*, 1717; and *Antiquities of Berkshire*, 1719.

Ashmun, JEHUDI, an American philanthropist, born in 1794. He was educated for the ministry, but taking an interest in the suppression of slavery, became secretary to the African Colonisation Society. In 1822 he went to Africa to establish the settlement of Liberia. He performed his task at the cost of his life, for he returned in 1828 to die in his native land. He received a public funeral.

Ashtaroth, or ISTAR (Gr. *Astarte*), a goddess whose worship prevailed amongst the Phœnicians in Syria and Africa. She is coupled with Baal, the sun-god, as being the moon-goddess. The Jews were more than once led astray into this idolatry, which they borrowed from the Sidonians (1 Kings xi. 5-53); Solomon built a temple to Ashtaroth on the Mount of Olives, and Jezebel, daughter of the King of Tyre (Judges ii. 13), celebrated her rites on a large scale. Josiah (2 Kings xxiii.) swept away her shrines, but at Aphac, on Mount Lebanon and elsewhere, this obscene cult was kept up until long after the Christian era. Greece and Rome adopted Ashtaroth under the name Astarte. Amongst the Greeks she was identified with Urania or the celestial Venus, but does not appear to have taken a strong hold upon the national mind in the best days of Greece. The Romans took more kindly to her worship, and Cicero identifies her with Venus, but others confounded her with Juno Cœlestis, or with Diana. In Egypt she was regarded as being one and the same with Isis, but was more probably identical with Hathor. Sometimes her image takes the shape of the head of an ox with horns; at other times she appears as a woman in man's attire or as a woman standing on a lion.

Ashton-under-Lyne, a parliamentary and municipal borough in Lancashire, about six miles E. of Manchester, on the N. bank of the River Tame. It returns one member. The church of St. Michael is Late Perpendicular. Among the public buildings are the Town Hall, in Classical style, and the Mechanics' Institute, with a large library. The trade consists chiefly of cotton-spinning and weaving, the manufacture of hats, brewing, and silk-spinning; there are also iron foundries, machine factories, and extensive collieries. The most ancient building in the town is the old Manor Hall (in existence before 1380), which is generally believed to have replaced a Saxon fortification; near it is Gallows Meadow, the scene of feudal executions. There are several objects of antiquarian interest in the neighbourhood. Pop. (1901), 43,890.

Ash Wednesday, the first day of Lent, observed in the Western Church since the seventh century. The name comes from the custom of strewing consecrated ashes, derived from the palms of the previous PALM SUNDAY (q.v.), introduced probably by Gregory the Great (600 A.D.), sanctioned by Pope Celestin III. in 1191. In the Anglican services the day is usually marked by the COMMINATION SERVICE (q.v.).

Asia, the largest continent of the world. It contains about 17½ million square miles, and exceeds by about one million square miles the New World, falling short to about the same extent of the collective area of the other great divisions of the Old World, viz. Europe, Africa, and Australasia. Europe and Africa are indeed from a geographical point of view appendages of Asia, while geologically the large and important group of islands extending from Sumatra to Australia are connected with the south-eastern seaboard of Asia. On three sides Asia is bounded by oceans; by the Arctic on the north, by the Pacific on the east, and by the Indian on the south. At its extreme north-eastern point Asia is separated by a strait barely 36 miles wide from the westernmost promontory of the New World. From Cape Romania, the extreme point of the Malay peninsula, to Cape Chelyuskin, which juts into the Arctic Sea, it is about 5,300 miles, and from the narrow waterway of the Suez Canal to Behring's Straits is about 6,700 miles. The general configuration of the continent is that of a rough quadrangle facing towards the four points of the compass, but broken on the south by the Arabian, Indian, and Malayan peninsulas. Recent exploration by Dr. Sven Hedin (1907–8), the Duke of Abruzzi (1909), and others, has added much knowledge of interior regions of the continent.

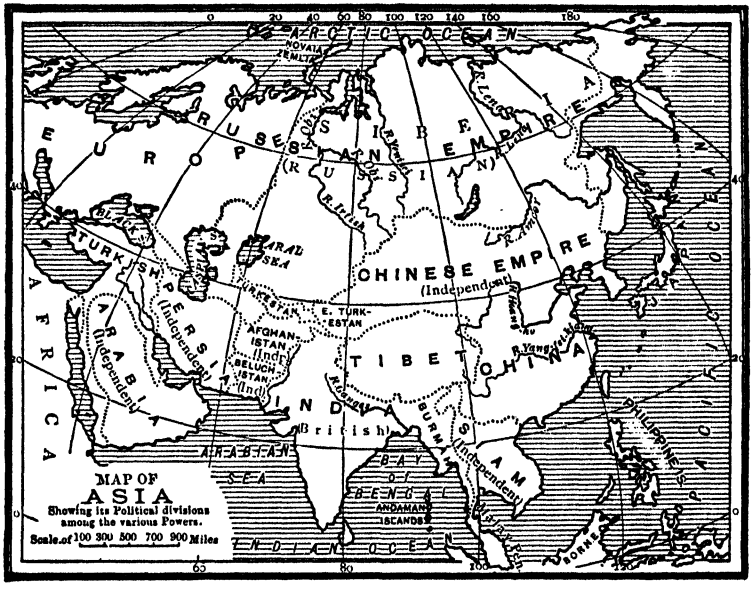
The *islands* of Asia, beginning from the east, are Sakhalin, Japan, where the climate is agreeably modified by the *Kuro Siwo*, the eastern counterpart of the Gulf Stream; the smaller group of the Liu-Kiu islands, which have long formed a subject of contention between Japan and China; Formosa, whence the transition through the Batanes and Babuyan groups to the Philippines is easy. Formosa, crossed by the Tropic of Cancer, stands on the verge of the torrid and temperate zones, and marks the extreme northern extension of the Malay, which here meets the Chinese race. Beyond one passes with the Philippines into Australasia proper, and the Malayan archipelago, through which the south-eastern extremity of Asia merges into the Australian continent. Modern scientific research has indicated a line of physical separation along the channel between Borneo and the Celebes, called the Straits of Macassar, to the west of which the flora and fauna are essentially Asiatic in their type, while to the south and east the Australian element begins to be distinctly marked. This boundary was defined by Wallace, the distinguished naturalist, and bears his name.

The entire northern confines of the continent are occupied by a broad belt of lowland marshes called *tundras*, which are fast frozen for some nine months in the year, and over which the Samoyedes hunt and fish. Hither in the short summer the reindeer comes to crop the mosses—the only vegetation in this rigorous climate A few hundred miles to the south the tundras give place to the rising ground and highlands of Southern Siberia. The whole of the interior consists of the loftiest and most extensive table-land in the world, with a height ranging up to 15,000 ft., and traversed by the mighty mountain ranges of Himalaya, Hindu Kush, Kuen Lun, Tian Shan, and Altai. This table-land widens out to the east, but towards the west four of the mountain chains converge towards a central knot, the Pamir or Roof of the World. A western extension of the same table-land is formed by the Iranian plateau, which stretches through Afghanistan, Baluchistan, and Persia, and even as far as Asia Minor and Mount Lebanon. This great plateau has several well defined divisions, such as the Tibetan highlands, the loftiest of all, buttressed by the Himalayas, and the Kuen Lun, the Pamir already mentioned, the Tsaidam depression north of Tibet, and the basin of the Tarim river which drains into Lob Nor at an altitude of about 2,000 feet. This huge mountainous mass, between the 65th and 100th meridian east of Greenwich, and the 28th and 35th degree of N. latitude, is the predominant feature of the continent. Notwithstanding the marked differences within its area, the enormous extent and great mean elevation of the whole region are enough to give to the entire continent an average altitude of no less than 1,600 feet, or about 600 feet more than Europe, and 500 more than the estimate made by Humboldt on the data available early in the 19th century. While the interior of the continent presents evidence of increasing desiccation, around the seaboard a slow process of upheaval has been going on. On the north coast, islands which a hundred years ago stood at some distance from the land are now connected with it by rocky isthmuses, and similar tendencies have been observed at various points from the Black Sea in the west to Kamschatka in the east.

Hydrography.—There are several distinct systems of inland drainage in Asia, such as the basin of the Tarim, which drains the vast plain of Eastern Turkistan, a region now occupied by an expanse of sandy desert fringed with oases dotted at intervals along its northern and southern confines, but formerly studded with populous cities and traversed by the historic route of the silk traders who trafficked between Cathay and the West. Other land-locked basins are the *hamun* or lake into which the Halmand conveys the drainage of Southern Afghanistan, the Dead Sea fed by the Jordan, and the Aral Sea, which receives the drainage of a vast area through the twin rivers Oxus (Amu-daria) and Jaxartes (Sir Daria). Formerly the basin of the Aral must have been of far greater extent, communicating with the Black Sea, the Caspian, and Arctic Ocean, and forming a vast Asiatic Mediterranean. Altogether the area of the interior catchment basins is estimated at about four million square miles, while Africa can boast of few besides the Chad and Ngami basins, and Europe and America have no such inland drainage. In large freshwater lakes Asia is singularly deficient, Lake Baikal being the only lake comparable to those of Central Africa and North America.

The seaward drainage comprises some of the largest rivers of the world. The Obi and Yenisei rise south of the mountains fringing the Mongolian plateau, and with the Lena (which now rises on the outer slopes, though it seems to have been formerly connected with the Angara basin) discharge their waters into the Arctic Ocean. The Amur rises

beyond the encircling range of the Mongolian tableland, and the head waters of the Hoang-ho and Yang-tse-kiang are found far inland on the crest of the Tibetan highlands. These three rivers flow to the Pacific. The southern rivers, the Mekong, Salwen, Irrawaddy, Brahmaputra or Sanpo, and Indus, rise behind the range of the Himalaya mountains, while the Ganges and Jumna rise on their outer slopes. In the extreme west of the continent the Tigris and Euphrates flow to the



MAP OF ASIA, SHOWING POLITICAL DIVISIONS.

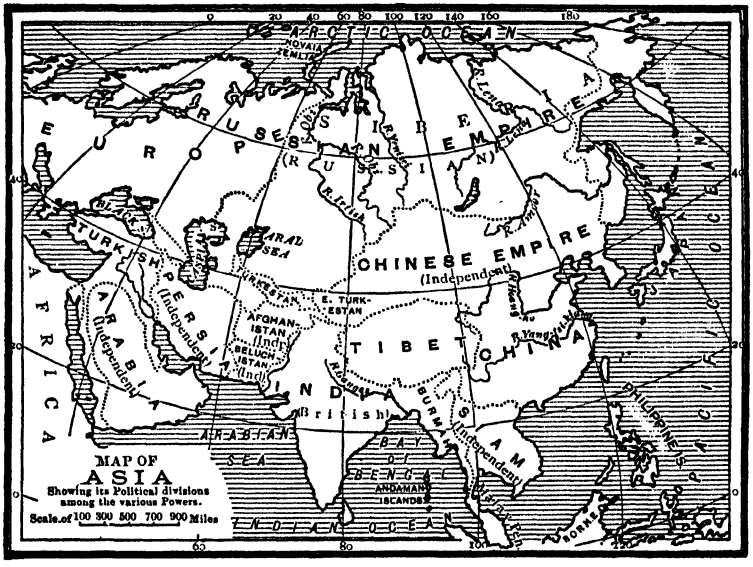
Persian Gulf, and the Araxis to the Caspian from the Armenian and Kurdistan highlands. The list of great Asiatic rivers is almost completed by the Kizil-Somak and Orontes in Asia Minor, and the Nerbudda, Godavari, and Kistna of peninsular India.

The greater part of this vast continent is characterised by extremes of heat and cold and by great dryness. In former times moisture was more abundant in Central Asia than at present. The Tarim basin was flooded by the Sihai or Western Sea, a vast expanse of water communicating through the so-called Dzungarian strait or depression with the still more extensive Han-hai. But while the inland plateaux and those of Persia and Arabia are among the driest, the great southern and south-eastern peninsulas are perhaps the wettest on the globe.

Flora.—The extensive limits of the continent, which stretch from Cape Chelyuskin within twelve degrees of the North Pole to Cape Romania near the equator, embrace a great variety of animal and vegetable life. While the southern peninsulas abound in tropical and aromatic products, the northern tundras are almost destitute of vegetation. In India, China, and the intermediate regions rice forms the staple food of many hundred millions of human beings, whereas the nomad Kirghiz and Kalmuck tribes of the Mongolian and Siberian steppes are limited almost entirely to an animal diet. The tea plant flourishes in Japan, China, and Assam, and within recent years has made such progress in Assam, Ceylon, and on the Himalayan hills that the quantity exported thence to the United Kingdom exceeds the quantity brought from China. Coffee, which is supposed to be indigenous in Arabia, is cultivated in Ceylon and Southern India. Opium is largely grown in India and China, indigo and sugar flourish in the two eastern peninsulas, cinnamon in Assam and Ceylon, and aromatic plants in Arabia. Forest trees are found along the coast of the Euxine, Caucasia, the southern shore of the Caspian, the southern slopes of the Himalayas, Indo China, and South Siberia. Among the more useful species are the oak, walnut, pine, cedar, box, poplar, teak, bamboo, cocoanut, date palm, apricot, peach, and other fruit trees.

Central Asia produces most of the European grains and tree fruits, oranges, lemons and grapes, melons of special excellence, peaches and apricots, the fig and olive, vines and nut trees, besides hemp and flax, the garden rose and many other cultivated flowering plants. From India the banana has spread out to all parts of the tropical world, with rice and the sugar cane, indigo, and several sorts of cotton ; it is also the home of several palms, the cocoa and the areca palm or betel nut ; it has the

beyond the encircling range of the Mongolian tableland, and the head waters of the Hoang-ho and Yang-tse-kiang are found far inland on the crest of the Tibetan highlands. These three rivers flow to the Pacific. The southern rivers, the Mekong, Salwen, Irrawaddy, Brahmaputra or Sanpo, and Indus, rise behind the range of the Himalaya mountains, while the Ganges and Jumna rise on their outer slopes. In the extreme west of the continent the Tigris and Euphrates flow to the northern tundras are almost destitute of vegetation. In India, China, and the intermediate regions rice forms the staple food of many hundred millions of human beings, whereas the nomad Kirghiz and Kalmuck tribes of the Mongolian and Siberian steppes are limited almost entirely to an animal diet. The tea plant flourishes in Japan, China, and Assam, and within recent years has made such progress in Assam, Ceylon, and on the Himalayan hills that the quantity exported thence



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largest poppy fields, yielding opium (though the cultivation of the plant has enormously extended of late years in China, notwithstanding strenuous attempts to suppress the traffic), giant bamboos, ebony, teak (for ship building), and other useful timber.

The hilly region intermediate between China and North-Eastern India is probably the native home of the tea-plant; the East India islands and the Malay peninsula of spices, cinnamon, black pepper, and cloves, and of the guttapercha tree or *ficus elastica*.

Fauna.—The uplands of Central Asia are the native land of the horse and the ass, of the ox and buffalo, the sheep and goat, from which the domesticated varieties appear to have derived their origin. Both varieties of the camel (the Arabian and Baktrian, the single and double humped) are Asiatic. The yak with its coat of long hair is to the inhabitants of the highland of Tibet what the reindeer is to the tribes of the Northern Siberian plains, an important means of support and locomotion. Antelopes in vast numbers are also found on the Tibetan plateaux. The elephant, smaller, but more intelligent than the African variety, is a native of the tropical parts of Asia; the lion of Southern Asia is smaller than that of Africa; the tiger is found in its greatest beauty and strength in the south-eastern parts of the continent, though it does occur as far north as the Altai; bears are found in most parts, the white bear in the extreme north, and other formidable species in the more temperate parts, while those of the tropical region are harmless feeders on fruits and honey. Dogs are used by some of the Siberian tribes as sledge drawers; others are fattened in China for food; but in all Muhammadan Asia the dog is the scavenger of the towns and villages.

Mongolia and the central plateaux adjoining produce the argali, ovis poli, and other large wild sheep and goats, the Tibetan and Angora breeds being noted for the fineness of their fleeces. Farther northward are found the sable, civet, marten, blue and silver fox, and other valuable fur-bearing animals, which are mercilessly hunted throughout Siberia and Manchuria.

Tropical Asia abounds in monkeys, the largest being the orang-utan, the "wild man of the woods" of Borneo and Sumatra, while the gibbon is also found among others. Some are tailed, others, such as the orang, are tailless, but none have prehensile tails like the American monkeys.

The domestic poultry of all parts of the world seem also to be derived from the numerous gallinaceous birds of Asia; the pheasant takes its name from the Phasis river (the modern Rion, flowing to the Black Sea from the Caucasus), from the banks of which it was brought at an early period into Greece; the splendid peacock is a native of the East Indies.

Minerals.—Siberia, the flora and fauna of which are almost limited to its fine woods and fur-bearing animals, makes up for this deficiency by its mineral treasures; it is the great mining region of Asia, yielding gold, silver and platinum, copper and lead, coal and graphite. India was formerly the home of the Golconda diamonds, and now yields coal, iron, and salt; the regions adjacent to the Caspian yield salt, and the mineral oil of Baku, whither the Ghébr fire worshippers formerly made pilgrimages. The oil is now used in place of coal for the steamers on the Caspian and the locomotives on the Trans-Caspian Railway, and a brisk export to India has sprung up. The Dead Sea also occasionally casts up large masses of asphaltum or bitumen, whence its ancient name of Lacus Asphaltites.

Asia has given the rest of the world most of its domesticated animals and cultivated plants; it has also been the centre in which the germs of *religion* and learning have been fostered, and whence these have spread outward. The three monotheistic religions which have taken the widest hold on the minds of men (Jewish, Christian, and Muhammadan) arose from the Semitic peoples of South-western Asia. The purest of these has become the religion of enlightened Europe, but in its native country it has been overshadowed by Muhammadanism, which prevails in all South-Western Asia, in Asiatic Turkey and Arabia, in Persia and Turkestan, and which has penetrated deeply into Hindustan, and among the Malays of the East Indies. The religion founded by Zoroaster of Baktria (the doctrine of the *Magi* of the ancient world), with its scriptures called the Zend-avesta, is interesting from its antiquity. Originally a pure monotheism, it passed afterwards into a belief in a conflict between the powers of good and evil, light and darkness, the former of which will ultimately triumph. The descendants of the votaries of this religion are known as the Ghébrs (Turkish *Ghiaur*), and are scattered here and there over Persia at the present day. A branch of them after many migrations found shelter in India in the sixteenth century, and as the Parsees (people of Pars or Fars) now form about 20 per cent. of the population of the neighbourhood of Bombay.

In Hindustan, so far as Muhammadanism has not taken its place, the Brahminical religion (in several sects) prevails, and from it, based on the same philosophy, arose the religion of Buddha, which spread over Farther India, Tibet, China, and Japan, and which has far more numerous adherents than any other faith in the world. The Brahminical religion, a corrupted monotheism, has three principal gods—Brahma, the creator of the universe; Siva, the destroyer; and Vishnu, the preserver. Its scriptures are the Vedas, probably the oldest literary documents in existence. The transmigration of souls is an important part of this faith.

Buddha, from whom the Buddhist faith sprang, was prince, in the 6th century, of a kingdom which lay on the borders of Nepal and Oudh, and for forty years he preached in Northern India, whence his teaching spread to China in the subsequent centuries. In Tibet it has taken a somewhat different form, known as Lamaism, which has much in common with Roman Catholicism in its observances, especially in regard to processions, rosaries, and patron saints. In China the religion of Buddha now degenerates from its primitive purity, and, overladen with absurd dogmas and image-worship, keeps its place along with the systems of philosophy of Confucius and Lao-tze (Taoism). In Japan, also, Buddhism has been modified by contact with the much older faith in the gods, or *Sintuism*, the

hierarchy of which is composed of the Mikado, or spiritual emperor, besides ecclesiastical judges, monks, and priests.

Population.—Asia, supposed by some to be the cradle of the human race, is still the home of over half of the inhabitants of the globe. But the distribution is far from uniform. While the frozen tundra in the Arctic portion of the continent, the deserts of Gobi, and Eastern Turkestan are almost uninhabited, and Siberia, Tibet, Persia, and Arabia are mainly occupied by nomad tribes, the alluvial plains of the Ganges, Yang-tse-kiang, and Hoang-ho are among the most densely-peopled regions in the world. On the whole, the density of the population is in direct ratio to the abundance of the rainfall; and India, Indo-China, China, and Japan, over which blow the moist winds from the Indian and Pacific oceans, embrace the greater portion of the 792,000,000 inhabitants of Asia.

Political divisions.—While from a geographical point of view Europe may be described as a dependency of Asia, politically Asia may almost be regarded as a dependency of Europe, considering the influence and possessions of Russia and England. The continent may be divided into four political regions, which roughly correspond to the four main natural divisions, and even to the four predominant religious systems. The Russian possessions in the north have mainly an Arctic and inland drainage; and here is the original home of Shamanism. In the west, still held by the two great Moslem Powers of Turkey and Persia, the drainage is chiefly to the Euxine, Mediterranean, and Persian Gulf. The southern or British division drains into the Indian Ocean, and here Brahmanism is the prevailing belief; while the Buddhist world, occupying the eastern region, and comprising the Chinese Empire, Japan, and most of Farther India, drain mainly into the Pacific Ocean.

Inhabitants.—Asia is certainly the cradle of the MONGOLIC, and most probably also of the CAUCASIC division of mankind. Apart from the dark negritos of the Malay peninsula and the Deccan, who may be regarded as intruders from the Oceanic region (Eastern Archipelago), the whole continent has been occupied since neolithic times exclusively by these two stocks—Mongols chiefly in the north, east, and centre, Caucasians chiefly in the south-west. The ethnological parting line may have originally corresponded roughly with the western section of the main axis, running through the Caucasus and North Iranian escarpments to the Hindu-Kush and Pamir plateau. The primeval home of the Caucasic division would thus have been restricted to the Iranian table-land and the peninsulas of Arabia and Asia Minor, all the rest of the continent comprising the Mongolic division. But already before the dawn of history this parting line had been overlapped at several points, and from the earliest times Mongols, such as the Babylonian Accads, are found encroaching on the Caucasic domain, and Caucasians, such as the Aryan Hindus, encroaching on the Mongolic domain. Such migratory movements and interminglings have continued throughout the historic period mainly to the advantage of the Mongols, who have occupied most of Asia Minor and considerable portions of the Caucasus and Irania (North and Central Persia and North Afghanistan). The Caucasian gain is chiefly represented by the recent political ascendency of the Aryans (Russians, English, and French) in the north and south, and by the stream of Russian migration which has overflowed into central Asia, Siberia, and the Amur valley.

At present the Mongolic division comprises two main branches:—1. The INDO-CHINESE, all of whom speak languages of the isolating or absolutely uninflectional type wrongly called "monosyllabic." Their chief sub-groups are the *Bod-pa* (Tibetans) of Tibet and South Himalayan slopes; the *Burmese*, *Kakhyen* (Chins) and *Karens* of the Irawady and Salwen basin, Arakan and Tenasserim; the *Tai* (Siamese, Shans, or Laos) of the Menam basin, middle Mekhong and south-west Chinese frontier; the *Sinico-Anamitic* (Chinese, Tonkinese, and Cochin-Chinese, collectively Anamese); the *Mon* (Talaings or Peguans) of the Salwen and Irawady deltas; the *Nagas*, *Khasi*, and others of the South Assamese hills. 2. The MONGOLO-TATARS (Ural-Altaic family), all of whom speak languages of the agglutinating or loosely inflectional type derived from one primitive stock-language. Their chief sub-groups are the *Mongols proper* (Khalkas of East and Kalmucks of West Mongolia); the *Turki* or *Tatar* peoples; Yakuts of the Lena basin; Kirghiz of the south-west Siberian steppes; Usbegs of Khiva, Bokhara, and North Afghanistan; Turkomans of Turkestan, North Persia, East Caucasia, and Asia Minor; the *Tungus* (Tungus proper of Central and East Siberia), Manchus of Manchuria; the *Samoyed*, *Chukchi*, *Ostyak*, *Wogul*, and other nomad tribes of North and West Siberia. Outlying and more or less aberrant branches of the Mongolic division are the Coreans and Japanese with the Liu-kiu islanders in the extreme east; the Dravidians of Southern India (Telugu, Tamil, Malayalam, and others); the Cambojans, Chams, and Malays, of Indo-China and Malay Peninsula.

The Caucasic division comprises three main branches:—1. The EASTERN ARYANS (Hindus of India, Galchas of the Pamir and both slopes of the Hindu-Kush), Afghans and Baluchi of East Irania, Persians, Kurds, Armenians, and Ossetians, of West Irania, Armenia, and Central Caucasus, Hellenes or Greeks of the Anatolian seaboard. 2. The SEMITES, now mainly represented by the Arabs of Arabia, Mesopotamia, and East Syria, the Arab-speaking Syrians, Druses, Maronites of West Syria; the Arab-speaking "Chaldeans" of the Tigris basin and Lake Urmiah; and the Jews, chiefly in Syria, Palestine, and Arabia. 3. The CAUCASIANS proper, of the Caucasus, all speaking highly agglutinating tongues, which belong to several stock languages. Their chief sub-groups are the *Karthvelians* or Southern Caucasians (Georgians, Svanetians, Mingrelians, Lazes); the Cherkesses (Circassians), and Abkhasians of West Caucasus, who since the Russian conquest have mostly retired to Turkey; the Lesghians, Chechenzes and others of Daghistan or East Caucasus; the Kabardians of Central Caucasus. An aberrant Caucasic group would appear to be the Ainos of Yesso and the Kurile

Islands. For details see articles *Aryans, Caucasians, Draridians, Mongols, Semites, Turks, Tatars,* and special entries.

Asia Minor, the name given since the tenth century A.D. to the portion of Asia which projects westward into the Mediterranean and Ægean Seas, and is only separated from Europe by the narrow channels of the Bosphorus and the Dardanelles. The eastern boundary of this peninsula can only be defined by a line drawn from the Gulf of Scanderoon northwards to a point just east of Trebizond on the Black Sea. The area thus cut off is about equal to that of France. It resembles Spain in physical characteristics, consisting of a great inland plateau with an elevation of 2,000 feet or more above the sea, and fringed by a narrow strip of low-lying coast. This table-land is broken up into basins by great mountain ranges, and one of these basins, having no outlet to the sea, drains into an extensive series of shallow lakes stretching from Phrygia through Lycaonia into Cappadocia. The mountain system comprises the Taurus, Anti-Taurus, Erjish-dagh (Argæus), Sultan-dagh, Emir-dagh, Baba-dagh (Cadmus), Demirji-dagh, Ak-dagh, Kaz-dagh (Gargarus), and Olympus. The rivers are of historical rather than geographical importance. The Euphrates skirts the eastern border, and amongst others the Kizil-Irmak (Halys), the Sakaria (Sangarus), the Khoja-Tchai (Granicus), the Scamander, the Bakyr-Tchai (Caicus), the Pactolus, the Bojuk and Kutchuk Mender (Great and Little Meander), the Xanthus, the Gerenis-Tchai, the Gok-Su, and the Sihon and Jihon are the most remarkable. The Lakes of Nicæa (Isnic-Göl), Apollonia, and Miletopolis with the Lycaonian salt lagoons above-mentioned, are the most extensive. The climate offers wide variations from the dry, bracing, cold air of the central uplands to the damp, hot, and often malarious atmosphere of the littoral. Almost every vegetable product can be raised except such as the date-palm and other trees and plants needing tropical heat. The cherry and apricot are supposed to have been imported hence into Europe. The lions, tigers, and leopards of ancient times are extinct, but wolves, bears, foxes, and wild boars are plentiful, and many varieties of the deer tribe are to be found. The long-fibred fleeces of the sheep and goats have been valuable from antiquity. Camels and buffaloes, though numerous, are of recent introduction. Old geographers divided the peninsula into—1. Pontus; 2. Paphlagonia; 3. Bithynia; 4. Mysia; 5. Lydia; 6. Caria; 7. Lycia; 8. Pamphylia; 9. Cilicia; 10. Pisidia; 11. Phrygia; 12. Galatia; 13. Cappadocia; 14. Lycaonia and Isauria. The history, limits, and ethnographical characteristics of each division will be treated under the separate heads. Greeks early established themselves on the coasts. Lydia for a time held a wide supremacy. Persia from 546 to 333 B.C. nominally governed the various subject races. The Seleucid dynasty of Syria held sway for a brief period, and the kings of Pergamus and Pontus erected separate monarchies, but all were virtually merged in the Roman Empire at the accession of Augustus. A long spell of prosperity then succeeded, which was broken by the incursions of the Seljukian Turks in the eleventh century. The Crusaders broke this power, and the Byzantine Emperors controlled the northern and maritime districts until, in the 15th century, the Ottoman Turks swept away the last vestiges of Greek domination, and still hold what they conquered, though Russia is gradually encroaching on the shores of the Black Sea.

Asiatic Society, ROYAL, a society formed for investigating the literature, arts, and science of Asia.

Asiphonida, those bivalved mollusca (LAMELLIBRANCHIATA) without, or with only imperfectly developed, respiratory siphons. [ANODON.]

Asirgarh, or HASSIR, a fort and town at the edge of the Satpura range, in the Bombay presidency of British India, 15 miles N. of Burhampur. The fort occupies a strong position on a hill above the town. It was captured by the British in 1803, and again in 1819, since which time it has been in their possession.

Askalon, ASCALON, or ASKULAN, a town of Palestine on the coast of the Mediterranean, 14 miles north of Gaza. It was one of the five chief cities of the Philistines (Judges i. ii.), and is supposed to have been colonised from Tyre. The Jews ultimately became possessed of it, and Herod made it the second city of his kingdom. The temple of Derceto was a remarkable feature of the place. The Crusaders won a great victory here in 1099, but in 1270 the Saracens destroyed the fortifications, and Askalon is now a heap of disjointed masonry.

Askern, a village in the West Riding of Yorkshire, about six miles from Doncaster on the Great Northern Railway, frequented by many visitors for the sake of its mineral springs.

Askew, or ASCUE, ANNE, the daughter of Sir William Askew, of Kelsay, Lincolnshire, was born in 1529. She seems to have been an accomplished and pious woman, and was married early to one Kyme, whom she disliked. Her husband treated her with cruelty, and finally turned her out of doors because she read the Bible and was inclined to adopt the principles of the Reformation. Anne went to London with a view to getting a separation, but the unhappy woman was imprisoned in Newgate, tortured hideously by Lord Chancellor Wriothesley and Sir R. Rich, and at last (1546) burnt for a heretic in Smithfield. She behaved with the utmost firmness and gentleness to the last.

Askja (Icel. *basket*), the largest volcano in Iceland, near the centre of the island, with a vast crater 17 miles round and 23 square miles in area, containing a hot-water lake five miles round. Its height is 4,633 feet above sea. It first attracted general attention during a great eruption in 1875. There are, however, traces of many earlier eruptions.

Asmodeus, or ASHMEDAI (Heb. *the destroyer*), a demon created by Jewish superstition and perpetuated in Le Sage's romance *Le Diable Boiteux*, "The Devil on Two Sticks." According to the Talmud he was the offspring of an incestuous alliance between Tubal Cain and Noëma, and drove Solomon out of his kingdom, but was overcome and enslaved

by that king, who forced him to work in the building of the temple. He appears in the Book of Tobit (in the Apocrypha) as the king of devils, and the lover of Sara, daughter of Raguel, and he killed seven of her husbands on their bridal nights. Tobias (Milton's *Paradise Lost*, iv.) drove him by a charm into Egypt, where he was caught and bound. Vanity and dress were his especial province. He is perhaps identical with the Persian *Æshma Dæva*.

Asoca, an Indian tree frequently mentioned in Indian poetry, belonging to the order Leguminosæ; the flowers are of a rich orange colour. It is sometimes called *Ashoca*.

Asoka, the king of Behar or Magadha in India, who, coming to the throne in 264 B.C., became an ardent Buddhist, and in 244 convened the third great council of that creed at Patna. His edicts engraved on stone columns or rocks are still to be met with all over the north of India. His grandfather was the Sandrocottus of Alexander's time.

Asopus (mod. *Asopo*), a river of Bœotia in ancient Greece. Taking its rise in Mount Cithæron it crossed the territory of Platæa and emptied itself into the Eubœan Sea opposite Eretria.

Asp, a word derived from the Greek, and often used in classic and English literature in the general sense of "venomous serpent." The asp which Cleopatra made the instrument of her suicide was probably the horned viper (*Vipera cerastes*). The asp of Scripture cannot be identified with certainty, but as the same Hebrew word which is elsewhere translated "asp," is in Ps. lviii. 4 translated "deaf-adder," the context of this passage ("which will not hearken to the voice of charmers") has been thought to refer to *Naja haje*, closely allied to the cobra (q.v.), and used by Egyptian snake-charmers in their performances to the present day. The name is sometimes applied to *Vipera aspis*, a European viper, more venomous than the English species. [VIPER.]

Asparagus, the young annual leafy shoots of the Liliaceous *Asparagus officinalis*, a native of our coasts, cultivated since Roman times, is now in enormous request, and is largely imported. The fully-grown plant is much branched, bearing its minute flowers and round scarlet fruits on little twig-like green branches. Several species are cultivated for the sake of this feathery spray. There are various uses to which asparagus is put, but it is most generally employed as a vegetable.

Aspasia, a beautiful and intellectual courtesan (*hetaira*) of Greece, was born at Miletus, and coming to Athens at the most brilliant period of Attic history set up a school of rhetoric. Her house was frequented by all the greatest men of the day. Socrates, Pericles, and Alcibiades were among her many guests, and for her sake Pericles abandoned his lawful wife, and pleaded her cause before the Areopagites when she was accused of impiety. She is said to have greatly influenced his policy. After his death in 429 B.C. she transferred her affections to Lysicles, a cattle-dealer, and raised him by her advice and interest to a high position in the State.

Aspen (*Populus tremula*), one of the poplars, native to the northern part of the Old World, is a tree with furrowed bark; branches somewhat

BRANCH OF ASPEN (*Populus tremula*) WITH CATKIN.

pendulous; downy, reddish shoots; buds slightly viscid; leaves on very long laterally-compressed stalks, constantly quivering in the wind; and flowers in large catkins. Its wood is soft and white, and is now largely used in paper-making.

Aspergillum, the watering pot shell; it belongs to the family GASTROCHÆNIDÆ, and lives in sand on the shores of the Red Sea, Pacific, etc.

Aspern, or GROSS ASPÄRN, a village in Austria, situated on the Danube, about five miles E.N.E. of Vienna. It was the scene of Napoleon's defeat by the Austrians under the Archduke Charles in 1809.

Asphalt, or mineral pitch, a natural mixture of carbon and its compounds, containing from 77 to 88 per cent. of carbon, 7 to 9 per cent. of hydrogen, together with oxygen and some nitrogen. It occurs in various countries, mostly tropical; and in different geological formations. It is black or brownish-black, and may be a viscid dull paste or a lustrous solid with a conchoidal fracture. In Trinidad it forms a lake of 99 acres, varying in solidity and giving off sulphuretted hydrogen. In the Val de Travers in the canton of Neufchatel it occurs under the form known as asphalt-stone, a limestone impregnated with bituminous matter. It is largely used for pavements and in preparing roofing-felts.

Asphodel, a name applied either to the lily-like genus *Asphodelus*, many of which are cultivated for their flowers, or to the British *Narthecium ossifragum*, a member of the Rush tribe, with spikes of yellow, star-like blossoms, followed by orange-red fruits, growing in bogs and erroneously supposed to cause disease in the bones of sheep. In Greek mythology, an "asphodel meadow" is the home of the blest after death.

Asphyxia. When the due aeration of the blood in the lungs by the processes of respiration is interfered with, difficult respiration or dyspnœa

is the result, and if relief be not afforded death by asphyxia occurs. Asphyxia may arise from obstruction in the respiratory passages, from paralysis of the muscles of respiration, or from some interference with the supply of oxygen from the surrounding atmosphere. In the development of asphyxia three stages are described: in the first the movements of respiration become exaggerated and the increasingly venous character of the blood causes lividity of surface particularly noticeable in the lips and face; in the second stage general convulsions occur, and finally death is ushered in by the stage of exhaustion in which muscular movement is only manifested in an occasional sighing inspiration, while insensibility becomes complete. In the asphyxia of drowning all three stages are passed through in from two to five minutes; artificial respiration (q.v.) is, however, sometimes successful in effecting restoration many minutes after the apparently complete cessation of the vital functions.

Aspic (Fr. *aspic*), a savoury meat jelly containing fish, game, etc. The name may be derived from its coolness (Fr. *aspic*, asp), or from the spikes (Fr. *spic*) of lavender originally used to flavour it.

Aspidobranchia, or RHIPIDOGLOSSA, the suborder of Gastropoda, in which the lateral teeth of the tongue or *radula* are in fan-shaped series.

Aspidochirotæ, a sub-order of Sea Cucumbers including the common genus Holothuria. The group is characterised by the possession of peltate tubercles, tube feet, and respiratory trees.

Aspinwall, or COLON, a seaport on the north coast of Panama in the United States of Colombia, Central America. It stands upon the coral island of Manzanilla, and was founded in 1850 as the eastern terminus of the Panama Railway, taking its name from the originator of the line. It is a busy and increasing town. The strip of land through which the line runs has since 1873 been proclaimed neutral territory

ASPLENIUM TRICHOMANES.
(Showing (a) fronds with *sori*.)

Aspirate (Lat. *adspiro*, to breathe upon), a term applied to the sound of *h*, and of all letters or combinations of letters containing it, as the Greek *phi*, *chi*, and *theta*, or the English *th*. In Greek writing the initial *h*-sound is indicated by a special sign, the "rough breathing," to which the name is also applied.

Asplenium, the Spleenworts, a genus of ferns, formerly reputed to be a remedy for the spleen. They are characterised by having their linear sori, or clusters of spore-fruits, along the veins on the backs of their fronds and covered with an elongated membrane attached by one side to the vein.

Aspromonte, a mountain at the extreme south-west of Italy, overlooking the Messina Straits. Its summit is nearly 7,000 feet high.

Aspro Potamo (anc. *Achelöus*), the largest river of Greece. It rises in Mount Kodjaka, near Janina, and flowing south falls into the Ionian Sea about 15 miles from Missolonghi after a course of nearly 100 miles. [ACHELÖUS.]

Aspuzi, a town in the vilayet of Aleppo, Asiatic Turkey. It has a high and healthy position, which causes it to be resorted to in summer.

Asquith, RIGHT HON. H. H. (b. 1852), was educated at London and Oxford and called to the Bar in 1876. In 1892 he was made Home Secretary. From 1903–5 he vigorously opposed Mr. Chamberlain's Fiscal policy. In 1905 he was made Chancellor of the Exchequer in the Liberal Ministry, and in 1908 became Prime Minister, retaining that office after the 1910 General Election.

Ass, any individual of the old genus *Asinus*, now merged in *Equus*. [HORSE.] Asses are distinguished from horses by their generally smaller size, long ears, upright mane, short hair at the root of the tail and a tuft at the extremity, in the presence of warts on the fore legs only, a distinct line on the back, and the persistence of stripes. This definition includes the Dauw, the Quagga, and the Zebra (all which see), and is so used by zoologists. Popularly the term is restricted to wild forms without body stripes, and to the domesticated species (*Equus asinus*), or donkey. [KIANG, ONAGER.] The ass was reduced to the service of man at a very remote period, probably in the East, certainly in a warm, dry climate, as is evinced by their repugnance to cross water (which is shared by the camel) and their habit of rolling in the dust. The colour of the common ass is generally some shade of grey, with a dark stripe on the back and streak on the shoulder, the whole forming a cross-like figure. Black and white varieties occur; and in the East white asses have long been reserved for the use of persons of high rank. In Britain the ass is especially the poor man's beast of burden, for which its patience, endurance, and ability to subsist on hard fare, peculiarly fit it. Its small size is probably due far more to want of care in breeding than to cold, for in Western India there is a breed still smaller than our form, and not much larger than a Newfoundland dog. From about the beginning of the latter half of the nineteenth century there has been a great improvement in the British breed of asses, especially in and around the Metropolis. This is in great measure due to the

exertions of the late Earl of Shaftesbury (1801–85), who did much to teach the costermongers of London that self-interest, if no higher motive, should lead them to care for their beasts of burden; and now one may often see in costermongers' barrows asses carefully groomed, capable of a respectable rate of speed without the application of whip or stick, and by no means open to the proverbial reproach of stupidity. In Spain asses are carefully bred, and as much as £200 has been paid for a stallion ass for breeding purposes. Entire asses are largely imported from Spain, Malta, and France, into Kentucky, where they are used for breeding mules. The male ass is capable of procreation at two years old, and the female goes eleven months with her foal. Hybrids between the horse and ass are common. [HINNY, MULE.]

Assam was formerly a separate province in the north-east of British India. It was ceded to England after the Burmese war in 1826. From 1832 to 1838 Upper Assam was an independent native state. In 1873 the whole territory, with the addition of Cachar, was formed into a province under a Chief Commissioner. In 1905 the province of Eastern Bengal and Assam was formed by the addition of the districts of Bengal Proper which lie east of the Ganges to Assam, and was placed under a Lieutenant-Governor. The total area of the province is 106,130 square miles. The Himalayas bound Assam on the north; on the east and south it is cut off by mountains from Burma and Silhet; Kuch Behar lies to the west. The country consists of a succession of valleys watered by the Brahmaputra and its tributaries, which are very numerous. The soil is fertile, producing plenty of rice, maize, sugar, hemp, and jute on the lower levels, whilst tea plantations cover the hills.

Assassins, originally a Moslem sect with peculiar secret doctrines derived from the Koran, Judaism and Christianity. The name comes from its founder Hassan-ibn-Sabah. Their chief stronghold was in North Persia, at the Alamur (*eagle's eyrie*), near the Takht-i-Sulaiman Peak, in the Elburz range, which was taken in 1270 by the Mongols. The direct descendant of the head of the sect (the "Old Man of the Mountain") now resides in Bombay. All its enemies were regularly murdered by an organised band, which formed one division of the novices of the sect. Hence the modern use of the term.

Assault, an attempt to apply force to the person of another against his will: also, the act of depriving another of his liberty. To assent, however, does not always deprive an act of violence of the character of an assault, for the combatants at a prize-fight are guilty of one. "Battery" is in popular language comprised in "assault," but is technically distinguishable, inasmuch as the former involves an actual touching of the person A common assault is punishable with a year's imprisonment. Where actual bodily harm ensues, it is punishable with penal servitude for five years; and other aggravated cases are specially provided for, and subjected to a severer code, *e g.* assaults with intent to commit felony, and indecent assaults on females. No mere words can ever amount to an assault.

The Scottish law is very similar to the above; a separate offence known as "battery pendente lite" was formerly recognised there. It was the offence of assaulting an adverse litigant, and was created by old statutes of 1584, and 1594, which enacted that the offender should on conviction lose his case. These statutes were repealed in the year 1826.

In the United States there are particular statutes providing for punishment of assaults on Government officials while acting in the discharge of their duties.

Assaye, a village in the protected State of Haiderabad, Southern India. Here in 1803 General Wellesley, afterwards Duke of Wellington, with 4,500 men, utterly defeated the Mahratta force of 50,000 under Scindiah and the Rajah of Berar.

Assaying, the art of determining the proportion of any specified metal in a metallic ore or alloy. The methods used are very various.

Assegai, a missile weapon, thrown with the hand, used by the Zulus and other South African tribes. It resembles a javelin and is sometimes of considerable length.

Assembly, (1) the title given to the supreme deliberative body of the Scottish Established Church. The delegates are sent from each presbytery, royal burgh and university in Scotland. Its functions are deliberative, judicial, and legislative. There is a similar Assembly in connection with the Free Church of Scotland. (2) *National Assembly* was the name given to a body which was established in 1789 in France, when the clergy and privileged nobles refused to be associated with the commons. The Abbé Siéyès (q.v.) therefore proposed the establishment of this National Assembly. They drew up no less than 3,250 decrees, and having thus laid down the basis of a new constitution, they dissolved in 1791.

Asser, JOHN, or ASSERIUS MENEVAISIS, a learned monk of St. David's, Wales. He was the friend and teacher of Alfred the Great, and tradition has it that the foundation of Oxford was due to his advice. He was made Bishop of Sherborne, and wrote a Life of Alfred, which was published by Archbishop Parker in 1574. He died in 910.

Assessment, in ordinary parlance, implies fixing the amount of an unliquidated sum as damages, which may be done by a jury, referee, or judge.

The word "assess" has a technical and also a popular usage as applied to taxes; "assessed taxes" being burdens charged upon persons in respect of houses inhabited by them, in respect of the use of male servants, dogs, carriages, and armorial bearings.

Rates in respect of land and houses are calculated on value, which is arrived at by "assessment" made once every five years. Taxation by assessment existed in the reign of Elizabeth, when a parochial assessment was made, a man being rateable for all which he occupied in the particular parish. The provisions now applicable to the assessment of the poor

rate are those of 6 and 7 Wm. IV. ch. 96 (an Act for the regulation of parochial assessment), under which the assessed rate must be made on an estimate of the rent at which the property might reasonably be expected to let from year to year, after deducting insurances, repairs, and other necessary outgoings. By subsequent statutes (25 and 26, and 27 and 28 Victoria) the mode of assessment has been somewhat remodelled. The rating authority is now the County Council having jurisdiction in the district. (*See* Stephens' *Commentaries*, 11th edition, vol. 3, chap. ii., p. 72, and the Act for the Regulation of the Parochial Assessments (6 and 7 Wm. IV., c. 96), and the Amendment Acts of 1862 and 1864.) [INCOME TAX. INHABITED HOUSE DUTY.]

Assessor. (1) Any person appointed to assess or value property; (2) any person who sits next another as inferior in dignity; (3) any person called in to sit beside and assist a judge. By the Common Law Procedure Act, 1854, trial of questions of fact were authorised to be held before a judge with assessors; and by 36 and 37 Victoria, c. 66, questions of fact or account may be ordered to be tried before official or special referees with assessors. Under the Judicature Act, 1873, the High Court or Court of Appeal may call in the aid of one or more assessors specially qualified in any action or matter, to try and hear the matter in question wholly or partially with the assistance of such assessors. By the County Court Admiralty Jurisdiction Act, 1868, provision is made for the appointment of assessors of nautical skill and experience in Admiralty actions, and such assessors frequently sit in County Courts under the powers of this Act. An assessor differs from a referee in having no voice or power in deciding questions, his duties being confined to assisting the deliberations of the Court. Assessor is also a term for officers in the Scottish Universities, they being nominated by the members at large.

Assets, literally, estate of a deceased person *sufficient* to pay his debts; in practice the word is also applied to such estate where there is a deficiency. A general division of assets is made into *real* and *personal*: also into *legal* and *equitable*. Real assets consist practically of manors, advowsons, tithes, and freehold lands, whether in possession or reversion. Personal estates, as roughly stated, are the next presentation on an advowson to a church where the living is full; leaseholds; in certain cases, estates held for lives; growing timber; damages recovered; money and securities for money or stocks. Legal assets are such as a creditor might, until the recent fusion of law and equity, have made available for his debt in an action at law; equitable assets could have been reached by the medium of the Court of Chancery. This distinction has ceased to have much more than a historical importance since the Judicature Act, 1875, for in administering insolvent estates the same rules, viz. those of bankruptcy tribunals, are now to prevail in all courts; and by those rules all debts are put on the same footing, whereas before that time the priority of debts of different degree (*i.e.* debts secured by deed under seal as opposed to debts wanting in that formality) depended upon the question whether the fund applicable for payment fell within one or other of the classes, legal or equitable assets.

Assiento, or ASIENTO, TREATY, a Spanish term signifying a contract or convention entered into between Spain and some other country for regulating the supply of negroes for its American colonies. Spain having little intercourse with those parts of Africa from which slaves were obtained, used to contract with some other nation that had establishments on the western coast of that continent for the supply of its South American possessions with negroes. Such treaties were made first with Portugal and afterwards with France, each of which countries in consideration of enjoying a monopoly of the supply of negroes to the South American dominions of Spain, agreed to pay to that Crown a certain sum for each negro imported. In both cases the assiento was taken by a commercial association in France. Both the Portuguese Company and the French were ruined by their contract. England was a party to a similar treaty during the twenty-six years which preceded the Treaty of Madrid in 1750.

Assign. [HEIR.]

Assignat, the name given to the French Republican paper money from 1789 to 1796. The notes were issued on the security of the funds due to the government from the confiscated church lands. They were ultimately issued to the number of over 45,000,000,000, but their value sank rapidly so that in 1795 no less than 3,000 were given for a louis d'or, instead of 24.

Assignee, the proper designation of an official in bankruptcy proceedings, being the person in whom the bankrupt estate vests under the Bankruptcy Acts. [ASSIGNMENT.]

Assignment, a Scottish law term used in conveyancing to indicate the transference to another of any right or interest in any property or obligation. It is thus used in a sense analogous to that of the English term *assignment* (q.v.). The person who transfers the right or interest is known as the *cedent*, and the person to whom the transference is made is termed the *cessionary* or *assignee*.

Assignment. An assignment of land or real estate is properly a transfer or making over to another of a person's interest therein; but it is more particularly applied to express the transfer of an estate for life or years, or of movables. An assignment for life or years differs from a lease only in this, that by a lease a man grants an interest less than his own, reserving to himself a reversion; by an assignment he parts with the whole property, and the assignee consequently stands in the place of the assignor. Thus where a lease is assigned, the assignee (as well as the lessee) is liable to the landlord or reversioner for the future performance of the covenants entered into by the lessee, and such assignee remains liable until he assigns over in his turn to another person. And this liability attaches to him even without entry, where the assignment is by deed. However

he is not liable by force of the assignment except on such covenants *as run with the land*. And he is also entitled to enforce against the reversioner any covenant of that kind which the lease contains in favour of the lessee; and in case the reversioner conveys his interest to another, then to enforce it also against such grantee of the reversion. But if the transfer be for a single day short of the residue of the term, no liability or claim on the original covenants can arise between the transferee on the one hand, and the reversioner or the grantee of the reversion on the other hand, for it is then an underlease and no assignment, and the alienee not coming precisely into the place of the alienor, is in no privity with the reversioner. No deed or other writing was necessary at common law to the validity of an assignment, though in the case of a lease for life it could not be effected without livery of seizin, but by the Statute of Frauds a deed or written instrument was made necessary, and now an assignment of a chattel interest not being copyhold, in any tenements or hereditaments made after the 1st October, 1845, shall be void at law unless made out not only in writing but by deed; while on the other hand an assignment even of a lease for life may now be effected by deed of hand without livery of seizin. Assignment may be effected by any words which are sufficient to express the intention, but "assign" or transfer are the most technical expressions. (For ASSIGNMENT OF ERROR, *see* the heading ERROR.)

Assimilation, a term now used in vegetable physiology in a somewhat narrow sense, viz. for the retention of the carbon of atmospheric carbonic acid gas by green plants under the influence of light. The first stage in this process seems to be the union of the carbon dioxide with water taken in by the roots to form some polymer of formic aldehyde (CH_2O) such as glucose in solution, starch ($C_6H_{10}O_5$) being the first visible result. In animal physiology the term assimilation is used in a wider sense to include the whole of anabolism (q.v.), *i.e.* all the constructive changes in the food-substances after their first mere taking in, though most of these substances will be already not only organic but organised.

Assiniboia, a district of the North-West Territories, Canada, with an area of about 90,000 square miles. It is bounded on the north by Saskatchewan, on the east by Manitoba, on the west by Alberta, and on the south by the United States frontier. The *Assiniboine* river, which gives its name to the district, after a course of some 500 miles, flows into the Red River above Lake Winnipeg.

Assiniboines, Canadian aborigines, a large branch of the Dakota nation, from whom they have been separated for an unknown period, and by whom they are called *Hoha, i.e.* "Rebels." There are two branches, the Mountain or Forest Assiniboines of the eastern slopes of the Rocky Mountains and about the head waters of the North Saskatchewan river, who are now nearly extinct, and the Prairie Assiniboines, of the Assiniboine river, to which they give their name, and thence southwards towards the United States frontier. Owing to the rapid settlement of the Canadian Far West, the Assiniboine domain has recently been greatly restricted, and now the only alternative before them is either to disappear or break up the tribal connection and remove to the Government reserves. Some have already accepted plots of land along the banks of the Saskatchewan, where may now be seen their flourishing farmsteads. The Assiniboines are the Stone, or Stony Indians of some writers, so called either from their arid, stony domain, or from the custom of using hot stones for cooking their food. The proper national name is *Puatak*, whence Assini-Puatak, or "Mountain-Puataks" corrupted by the French Canadians to *Assinipoet* and *Assiniboine*.

Assisi (classic *Asisium*), a town of Italy, in the province of Perugia, about 13 miles from the capital of the same name. There are a few remains of ancient buildings, notably the ruins of a temple of Minerva, that form the portico of the Church of Santa Maria de Minerva. The chief interest of the place centres, however, in the Sacro Convento, where St. Francis founded the Franciscan order of mendicant monks. This building dates from 1230, and is still the resort of many pilgrims. It has two Gothic churches, one above the other; in a crypt beneath lie the relics of the saint.

Assize, a jury summoned for the purpose of trying a cause, or rather a Court of Jurisdiction which summons a jury by a Commission of Assize to take the assizes. Hence the judicial assemblies held by the King's commission in every county as well to deliver the gaols as to take indictments and to try causes at Nisi Prius, are commonly termed the Assizes. There are two commissions: (1) General, which is issued twice a year to the judges of the High Court of Justice, two judges being usually assigned to every circuit. [CIRCUITS.] The judges have four several commissions: 1. Of *oyer and terminer*, directed to them and many other gentlemen of the county, by which they are empowered to try treasons, felonies, etc. This is the largest commission. 2. Of *gaol delivery*, directed to the judges and the clerk of assize associate, empowering them to try every prisoner in the gaol committed for any offence whatsoever so as to clear the prisons. 3. Of *nisi prius*, directed to the judges, the clerks of assize, and others, by which civil causes, in which issue has been joined in one of the Divisions of the High Court of Justice, are tried on circuit by a jury of twelve men of the county in which the venue is laid. [NISI PRIUS.] 4. A *commission of the peace*, by which all justices are bound to be present at their county assizes, besides the sheriffs to give attendance to the judges or else suffer a fine. (*b*) The other division of commissions is specially granted to certain judges to try certain causes and crimes. (*See* Stephen's *Commentaries.*) The holding of winter and spring assizes is regulated by orders in council issued from time to time under the Winter Sessions Acts, 1876, and 1877, and the Spring Assizes Act, 1879.

Association of Ideas, in *Psychology*, the connection in the mind between two ideas, so that

the one tends to recall the other. Thus the sight of a particular place may recall an event which has happened there; the mention of a particular word in a conversation may recall a previous conversation. The laws which govern the association of ideas are those of *contiguity* and *similarity*. Thus, for instance, an action or idea which has occurred simultaneously or in close succession to another, recalls the second when it (the first) is again presented to the mind; and similarly with respect to actions or ideas which have any resemblance to each other. Some psychologists hold that other laws—such as the laws of contrariety, analogy, etc.—exist; but most agree that all are reducible to the two above-mentioned. These laws, virtually stated by Aristotle in his treatise on *Memory*, have been given a most important place in psychology by Hartley and Hume (18th century), and by James and J. S. Mill, Herbert Spencer, and Prof. Bain (19th century).

Assonance, in *Poetry*, the term used when the words of a verse have the same termination of sound, but yet are false rhymes. [RHYME.]

Assouan (anc. *Syene*), or ESWAN, is a town in Upper Egypt on the right bank of the Nile. It contains but few traces of its ancient greatness, but the interesting islands of Philæ and Elephantine are close by, as are the great quarries from which the *Syenite* was hewn to build the temples and palaces of Egypt. It was the starting-point of the Khartoum Expedition in 1884. The great Nile Dam or barrage completed in 1903 is built here, and is 2,187 yards long, with 180 under sluices by which the Nile flow is regulated and the irrigation of the surrounding country made possible, agriculture greatly benefiting thereby.

Assumpsit, strictly, the voluntary promise by which a man takes upon himself to do an act or make a payment; but the term has come to be applied to the form of action brought to recover damages for the breach of a promise where the performance of such promise has not been secured by deed or writing under seal. [PLEADING.] Assumpsit is the most common form of action in the United States.

Assumption, a term used like *Ascension* and *Annunciation*, with a special signification with regard to Scripture. *The Assumption*, in Christian writers, means the taking up into heaven of the Virgin Mary. The ecclesiastical festival celebrating the event is held on the 15th of August.

Assumption, or ASUNCION, the capital of the Republic of Paraguay in South America, on the left bank of the river Paraguay, 18 miles above the junction of the Pilcomayo. It was founded by the Spaniards in 1535 on the Feast of the Assumption, and possesses a good fortified harbour. The exports consist of maté (Paraguay tea), hides, sugar, tobacco, and rum.

Assumption Island, one of the Ladrone group in the Pacific Ocean (lat. 19° 41′ N., long. 145° 27′ E.). It is of volcanic origin, and is thickly covered with cocoa-palms and bread-fruit trees. Another island of the same name forms part of the Seychelles group. [ANTICOSTI.]

Assurance, a term synonymous with insurance, but more particularly applicable to life policies, while the term insurance is usually applied to contingencies not depending upon life, but arising from fire, losses at sea, etc.

Assyria. *Geography and Physical Features.*—Assyria proper was a table-land, bounded on the north by Mount Niphates and part of Armenia; on the east by that part of Media which lies towards Mount Zagros; on the south by Susiana and part of Babylonia; and on the west by the river Tigris, or

MAP OF ANCIENT ASSYRIA.

later by the Chaboras, a branch of the Euphrates In size it may be compared to Great Britain. It was divided into seven provinces, and contained many great cities, of which the chief after Nineveh, the capital, were Ashur, which alone stood on the west bank of the Tigris, Calah, Dar-Sarukin, Arbela, Tarbisi. In her times of prosperity Assyria extended her borders on every side; and the Greeks and Romans often included the whole of Syria and of the regions watered by the Euphrates and the Tigris under the name. Assyria and the neighbouring provinces were celebrated for their great fertility; they were the original home of wheat and barley, and the date-palm grew there to perfection. The irrigation of the crops was ensured by the annual overflow of the Tigris, beginning in March, and reaching its highest point in May; while, to keep this within due bounds, the country was intersected by a network of canals, into which the water of the river was admitted, or from which it was excluded, by a system of dams. To preserve the principal buildings from damage by inundations, they were raised upon platforms above the level of the plain. Stone is not rare in Assyria, and could easily be procured from the mountains; but, probably in imitation of the Babylonians, brick was generally used for building, stone being employed

only for foundations or facings. A soft gypsous kind of alabaster is found in the hills, and was used for sculpture. The chief amusement of the Assyrian kings—namely, hunting—was amply provided for by the lions, leopards, wild boars, deer, wild asses, and buffaloes which formerly abounded; ostriches, though now extinct, were still found here in the fourth century B.C. The horse was much employed in war; and the ox, the mule, and the camel were used as beasts of burden.

Recent Discoveries.—Through the Middle Ages Assyria remained almost unknown to Europeans, except by notices in the Old Testament and in classical writers. The natives of the district, however, had preserved the name and tradition of the site of Nineveh among the mounds of Nunia, opposite Mosul, on the Tigris, and pointed it out to Benjamin of Tudela when he passed by it about A.D. 1160. When about the seventeenth century the number of travellers in Asiatic Turkey increased, the ruins of Nineveh became better known, and were described by Rauwolf (1573), Sherley (1599), Tavernier (1644), Thévenot (1663), the Jesuit writer in the *Lettres Édifiantes* (1675), Otter (1734), Niebuhr (1766), Ollivier (1794). But with the beginning of the 19th century a fresh interest was taken in the examination and identification of all remaining traces of the ancient and powerful kingdom of Assyria. Claudius James Rich, the East India Company's Resident at Bagdad, visited Mosul in 1820 to inspect the mounds, and the inscriptions and other relics which he obtained there formed the nucleus of the Assyrian collection at the British Museum. A still more careful survey of the ruins of Nineveh was made in 1852 by Commander Jones, under the auspices of the Indian Government, the results of which show that the city walls were 7 miles 4 furlongs in circumference, containing an area of 1,800 acres, which might perhaps allow of a population of 174,000 inhabitants. To reconcile these facts with the statements of Ctesias and the Book of Jonah, it may perhaps be supposed that the name of Nineveh, used in a wide sense, sometimes included a neighbouring group of cities or suburbs. About 1850 Botta and Place excavated Khorsabad, ancient Dur-Sarrukin, 14 miles north-east of Mosul, containing the vast palace of Sargon, who founded it about B.C. 720. The most important excavations were carried out by Sir Henry Layard in the mound of Kouyunjik at Nineveh, and in that of Nimroud, 18 miles farther south, on the site of Calah. In the former the palaces of Sennacherib and Ashur-bani-pal, or Sardanapalus, and in the latter the palace of Ashur-nasir-pal, were laid bare, and an immense number of inscriptions and other objects discovered. Mr. Hormuzd Rassam and others have continued these excavations. Besides the large collection of inscribed clay tablets which formed the library of Ashur-bani-pal, the chief objects disinterred, and now to be seen at the British Museum, have been the immense series of bas-reliefs representing the campaigns, building operations, hunting expeditions, and private life of the Assyrian monarchs; the colossal figures of winged bulls which stood as guardians at the palace gates; and smaller objects without number, such as the bronze dishes and carved ivories of Phœnician workmanship found at Nimroud, the cylinders bearing the royal annals which were buried in the platforms of the palaces, and other antiquities in metal and glass.

Language and Literature.—Our knowledge of the Assyrian language dates from the publication by Sir Henry Rawlinson in 1847 of the inscription on the Rock of Behistun in North-Western Persia. This inscription, describing the wars of Darius Hystaspis, King of Persia, B.C. 521–485, is in three languages, the Persian, the Susian, and the Assyrian or Babylonian, written in three varieties of the cuneiform character, composed of strokes resembling wedges combined in different forms. The way for the decipherment of the Assyrian inscriptions had been prepared by the previous interpretation of some of the ancient Persian inscriptions earlier in the century by Grotefend, Burnouf, and Lassen; for as the Persian kings were in the habit of engraving their decrees or religious invocations in Assyrian (or Babylonian) and Susian side by side with the Persian, when the latter was once translated the former could be made out. Since, however, there are very few of these trilingual inscriptions, much remained and still remains to be done by scholars before the Assyrian language can be fully understood, by collecting parallel passages and comparisons with the Hebrew and other kindred languages of the Semitic family, to which the newly-found language belongs. The cuneiform writing was borrowed by the Babylonians and Assyrians from the Accadians or earlier inhabitants of the country; it consisted of more than 500 separate characters, representing not simple sounds like our alphabet, but syllables, or even whole words. Except in monumental inscriptions upon stone, the Assyrians wrote upon clay tablets, upon which, while still soft, the characters were impressed with a stick; upon this inconvenient but durable material, of which the country affords an abundant supply, every sort of composition was written. The most important documents were the historical cylinders and tablets containing the annals of the kings. An immense number of legal and commercial tablets have been found inscribed with deeds of sale, contracts, and records of lawsuits. Even private letters were written on clay tablets. A very large number of documents preserve forms of incantation used by priests and magicians, and lists of omens with their meanings. There are also legends of the gods and heroes of Assyrian mythology, among which are the famous tablets first translated by George Smith in 1872, which give the Babylonian account of the Flood transcribed by an Assyrian hand and forming part of the Royal library at Nineveh. Some of the Assyrian tablets give an Accadian text with an Assyrian translation, and others give lists of Accadian words and grammatical forms explained in Assyrian. This would seem to show that the old Accadian language was studied in Assyria as late as the seventh century before Christ, and that it held the position of a sacred language, like Latin in modern Europe.

History.—The history of Assyria begins to be known to us at a later period than that of

Babylonia. The first of the kings whose names are preserved reigned, perhaps, about B.C. 2000, but we know little more of them. In the fifteenth century B.C., Ashur-uballit, king of Assyria, appears among the correspondents of Amenophis III., King of Egypt. In 1275 B.C. Tukulti-Adar I. conquered Babylonia, which from this date down to the destruction of Nineveh remained of secondary importance, and was often subject to the Northern power. Tiglath-Pileser, whose capital was Ashur, the modern Kalah Sherkat, carried on successful wars against the nations of Armenia and Northern Syria, full accounts of which are preserved on his cylinders. After this reign the power of Assyria temporarily declined, but with Tukulti-Adar II. a new period of greatness began; and his son, Ashur-nasir-pal (B.C. 885–860), of whose time there are many monuments in the British national collection, extended his conquests in all directions. The extensive trade carried on by Phœnician merchants in Assyria at this time is largely illustrated by the Phœnician bronzes and ivories disinterred in the palace of Ashur-nasir-pal at Nimroud. The next king Shalmaneser II. (B.C. 860–825) is interesting to us on account of the tribute paid to him by Jehu, King of Israel, as recorded and represented on a sculptured obelisk; this was the first time that the Israelites came into contact with Assyria. Less than 100 years later, however, Tiglath-Pileser III. (745–727) carried away some of the tribes of Israel into captivity, and the destruction of the kingdom of Samaria was completed by Shalmaneser IV. (B.C. 727–722). Sargon (722–705) was a great conqueror and builder, being best known to us as the founder of Dur-Sarrukin, the modern Khorsabad. Sennacherib (705–681) invaded Syria and even invested Jerusalem, but King Hezekiah purchased his safety by a large tribute. Two years later Hezekiah having refused further allegiance Sennacherib again invaded Judah and took Lachish; the campaign, however, had an unsuccessful ending, for the Assyrian army was destroyed, perhaps by a sudden epidemic, and the king retreated to Nineveh. Esarhaddon (681–668) waged a series of wars, and took captive Manasseh, King of Judah, who was afterwards allowed to return to Jerusalem. Egypt also was invaded, and partly reduced. Ashur-banipal (668–626), the Sardanapalus of Greek writers, was the last of the great Assyrian monarchs; he conquered Egypt, Elam, Babylonia, the kingdom of his own brother, Shamash-shum-ukin, Lydia, and part of Arabia. After this successful reign the power of Assyria suddenly declined. We hear of two obscure kings, Ashur-etil-ilani-ukin and Sin-shar-iskun, but there is no doubt that about B.C. 609 Nineveh was taken by the combined forces of the Medes and Babylonians, assisted by an inundation, which washed away part of the walls, and that it was utterly destroyed. The province of Assyria proper fell under the dominion of the Medes, and Babylonia with other districts formed the new Babylonian Empire, ruled over by Nabopolassar and his successors. The name of Nineveh now disappears from history, only to be heard of again as the designation of a battle-field in the seventh century A.D. or as the site of a Christian monastery.

Religion.—The mythological and liturgical texts of the Assyrian literature have hardly yet been deciphered with sufficient completeness or accuracy to enable us to acquire a full knowledge of the Assyrian religion. We possess, however, the names of their principal gods. Ashur was the chief of the pantheon, and is always named first in the invocations of the kings. Sin was the moon-god, Shamash the sun-god, Anum the god of the sky, Bel the god of the earth, and Ea the god of the abyss and of profound wisdom. Rammanu (the Biblical Rimmon) was the ruler of the weather, Ishtar (the Biblical Ashtoreth) the goddess of love, Nebo the god of learning, and Nergal the god of war and hunting. The Assyrian temples always contained statues of the gods or goddesses, and sometimes a particular statue was held in special veneration, as the Istar of Nineveh, or the Istar of Arbela; only two statues of a god have been discovered in modern times, namely the two limestone figures of Nebo, disinterred in a temple at Nimroud, and dating from the eighth century B.C. With regard to public worship, we know that constant sacrifices and libations were offered to the gods, images were carried in procession, and a highly organised and richly endowed priesthood existed. The building and maintenance of temples were among the chief functions of the king, who himself boasted of the title of high-priest. Many Assyrian psalms or hymns have been found among the tablets, and some of them may be compared to the Hebrew psalms in character. The importance of religion in the life of the Assyrians may be seen in the fact that almost every inscription begins with an invocation to some of the gods, and that all the actions of the king are attributed to divine assistance. Some of the Assyrian legends, such as those of the Creation and the Flood, bear a close resemblance to the Hebrew narratives of Genesis; these, and indeed most of the religious beliefs of Assyria, seem to have been borrowed from the more ancient culture of Babylonia.

The Arts.—The Assyrians excelled in architecture, sculpture, and the industrial arts. Their towns were surrounded by high walls, with bastions and battlements, built of brick upon a basement of stone. Their palaces were vast structures of brick, in which vaulted rooms, with exceedingly thick walls, opened into extensive courtyards; there were three principal divisions, as in oriental palaces of the present day; namely, the *serai*, or men's apartments, the *hareem*, or women's residence, and the *khan*, containing rooms for the slaves, and the offices. The decorations of the chambers and halls consisted of designs painted on plaster, friezes of enamelled tiles, and, above all, of thin slabs of alabaster carved in low relief with scenes from the life and wars of the king. While the Assyrians failed in sculpture in the round, chiefly from lack of suitable material, they exhibited in these bas-reliefs a very high degree of skill, in spite of the want of perspective and other defects which mark an early stage of art. The finest sculptures are the latest; namely, those from the palace of

Ashur-bani-pal, in which the figures of animals in the various hunting scenes are rendered with a truth and spirit that has never been surpassed. It was in minute details that the Assyrian artist distinguished himself; nothing like the composition of scenes or co-ordination of figures is to be found. Apart from their own merit, the sculptures show us the perfection that the Assyrians had reached in the manufacture of artistic furniture, in jewellery, leather-work, and in those embroidered stuffs for

FIGHTING IN BATTLE. (*Assyrian Sculpture.*)

the production of which Mesopotamia and Babylonia retained their celebrity under the Roman Empire, through the Middle Ages, and down to our own time. Of Assyrian bronze-work we possess a very fine example in the ornamental bands, decorated in *repoussé*, with elaborate scenes from the history of Shalmaneser II. (857–822), which were once attached to the gates of his palace at the modern Balawat. The Assyrians seem to have been as fond as the Babylonians of cylindrical seals of precious stone, engraved with figures and inscriptions. Numbers of these, in cornelian, jasper, or hæmatite, are to be seen in all the museums of Europe, and some have even been found on the field of Marathon, where they had doubtless been worn by the Assyrian warriors in the army of Xerxes.

Present Condition.—The greater part of the ancient kingdom of Assyria is now contained in the modern province of Kurdistan. Owing to its greater elevation, the climate generally is much cooler than that of Mesopotamia. The country abounds in vegetation, and produces every sort of fruit and cereal; the so-called "manna" is still found on the leaves of the dwarf oak, and collected by the natives, who use it as a sweetmeat. The modern inhabitants, the Kurds, are a free and warlike race, and contrast favourably with the effeminate inhabitants of Mosul and Bagdad. Though partly of a different race from the old Assyrians, they preserve many of their ancient customs, and the weapons which they use in warfare resemble those described by Xenophon in relating his passage through the country. Besides the Mahometan Kurds, there are a large number of Christians of the Nestorian sect, and also the Yezidis, or Devil-worshippers. The larger portion of Kurdistan forms part of the Turkish Empire, but the spirit of the people is so rebellious that they are constantly in conflict with the authorities; the eastern districts are included within the Persian frontiers. Mosul, the modern successor of Nineveh, is a somewhat mean town, with a population of about 70,000. The climate of the district is unhealthy, being cold in winter, but in summer too hot for the comfort of Europeans. The principal remains of ancient Nineveh are concealed under the two vast mounds of Kouyunjik and Nebbi Yunus; the former covering an area of about 100 acres, and containing about 14,500,000 tons of earth; the latter, which derives its name from the supposed tomb of the prophet Jonah, occupying 40 acres, and forming a mass of 6,500,000 tons; besides these, there are ridges which cover all that remains of the ancient walls. The ruined palaces of the ancient Calah are hidden under the modern mound of Nimroud, which rises 133 ft. above the autumn level of the Tigris; extensive traces of the walls are also to be seen. Besides these there are numerous large mounds scattered over the country, and awaiting excavations which will no doubt lay bare others of the great cities which were flourishing in the period of Assyria's prosperity.

Assyrians. [SEMITES.]

Astacus, the Crayfish, a useful type of higher Crustacea. It lives in streams, walking on its long limbs or swimming backwards by the action of its tail-like abdomen. The body is composed of twenty segments, which are very dissimilar in appearance, though constructed on the same type. The anterior thirteen segments are fused to form the strong "cephalothorax," covered by a shield or carapace; the remaining seven form the abdomen. Each segment, except the last, has a pair of

appendages, very variable in form, but all constructed on the same fundamental plan. The six posterior pairs are swimmerets. These are preceded by eight pairs on the thorax, of which the posterior five are long walking limbs (three are clawed), and the three anterior are known as maxillipedes or jaw-feet; the appendages on the head consist of three pairs of jaws and two of feelers (antenna and antennule). There are a considerable number of gills on each side. The heart is dorsal and in a large space known as the pericardium. The mouth leads by a short œsophagus to a stomach armed with a complex masticatory apparatus. The sexes are separate. The eyes are on short stalks, one on each side of the head. It undergoes *ecdysis*, *i.e.* the skeleton is periodically thrown off to admit of growth.

Astarte, the Greek name of the female deity known in Syria and Phœnicia as Ashtaroth (q.v.).

Astarte, the Venus shells, a genus of Cyprinidæ, widely distributed in northern seas; it has existed since the time of the Coal-measures.

Astbury (classic *Asta Pompeia*), a parish in Cheshire, comprising the town and borough of Congleton, and the town of Buglawton. There are some thirty-five silk factories within its limits.

Aster, a large genus of composite plants, three-fourths of which are natives of North America, and one, *A. Tripolium*, the Sea Aster, is British. They vary in the form of the leaf, and range in height

ASTER TRIPOLIUM.
1, Floret of the ray; 2, stigma; 3, floret of disc.

from three inches to ten feet, but agree in having yellow tubular disc florets, and strap-shaped ray florets, either white, lilac or purple, with numerous imbricate bracts to the involucre. Several species are cultivated under the names of Michaelmas and Christmas Daisies.

Asterias, the genus which includes the common starfish of the English coast (*A. rubens*), and this serves as a useful introduction to the study of the ECHINODERMATA. It belongs to the class ASTEROIDEA, and the order CRYPTOZONATA. The animal consists of a central disc from which radiate several (usually five) arms. The mouth is at th centre of the lower or actinal side; it leads by short œsophagus to a stomach from which tw branches (hepatic cæca) run up each arm. The anu (not present in all Starfish) is on the centre of th upper or abactinal side. The main feature in th anatomy of the asteroids is the water vascular system this consists of a ring round the mouth; on this rin are nine reservoirs (Polian vesicles), a canal whic opens on the upper side by a filter-like plate (madre porite), and trunks, one of which runs up a furro on the lower side of each arm; upon these ar borne the tube feet by which locomotion is effected The blood vascular and nervous systems consist o similar rings round the mouth, bearing a branch u each arm; the former has also a ring round the anus The generative organs consist of a pair or pairs o glands in each arm. As each arm is thus provide with a complete set of organs, is bilaterally sym metrical in cross section, and is segmented, Häcke suggested that the starfish consisted of a series o worm-like animals fixed together by their heads The Starfish live mainly on shellfish, and sometime invade oyster beds in enormous numbers.

Asteridæ, a family of starfish, including th common *Asterias rubens* (q.v.).

Asterina, a genus of starfish, of which on species (*A. gibbosa*) is common round the English coast. It is the type of the *Asterinidæ*.

Asterisk (Greek *a small star*), a figure resembling a star (*), used in printing either to refe to a footnote or to denote an omission.

Asteroidea, the starfishes, a class of th ECHINODERMATA. The body is flattened, and i either pentagonal or has a varying number (usually five) of radiating arms. These are hollow and contain prolongations of the digestive and reproductive organs; the ventral side has a furrow containing the tube feet. The anus, when present, is dorsal, as is also the opening of the water vascular vessels. The skeleton consists of a series of many calcareous plates, the importance of which varies considerably in different families. The larva is a small free-swimming animal, provided with a series of arms, and known as a BIPINNARIA or BRACHIOLARIA. The most recent classification is into the PHANEROZONATA, those with large marginal plates (*e.g.* Astropecten), and the CRYPTOZONATA, those with these plates absent or rudimentary (*e.g.* Asterias). The first starfish occur in the Cambrian period.

Asteroids, or PLANETOIDS, a number of small planets existing between the orbits of Mars and Jupiter. The existence of a planet in this zone had been surmised by Kepler as far back as 1596, but it was not till the beginning of the 19th century that the first of the planetoids was discovered. More than six hundred have since been found, the four largest being Vesta, Ceres, Pallas, and Juno. They are at an average distance of about 250,000,000 miles from the sun. A very good telescope is necessary in order to see them, as the largest of them is only about 280 miles in diameter. [METEORITES.]

Asthenia, loss of strength, debility.

Asthenopia, a term applied to a group of symptoms associated with certain ocular defects. Thus in Hypermetropia (q.v.) headache with pain and inflammation on use of the eyes are commonly met with. Asthenopia is too frequently overlooked, or at any rate it is not recognised that the eyes are at fault. Persistent headaches in children should always suggest the necessity of a professional opinion upon the eyesight.

Asthenosoma, a deep-sea Echinoid with a flexible test; it is of interest, as many of the oldest known Sea-urchins resembled it in this respect.

Asthma, a term loosely applied in common parlance to almost any form of chest affection. In its correct use the word should be employed to designate a peculiar spasmodic affection of the bronchial tubes leading to recurring paroxysms of distress and laboured breathing. True spasmodic asthma is frequently hereditary, and is curiously dependent upon certain exciting causes, such as certain smells, the consumption of particular articles of food, and especially the influence of locality. Many asthmatics can only live in large towns; nay, sometimes they breathe in comfort in one particular part of a town, while their removal to some closely neighbouring spot is attended by the development of an asthmatic attack. During a paroxysm the distress is intense, the chest is expanded, and even the most powerful efforts of the muscles seem unable to promote that interchange of air which is necessary for the due aeration of the blood. The attack commonly lasts two or three days, and in young people recovery is rapid, but in old subjects of the disease organic changes are apt to develop in the lungs, making convalescence more prolonged. The occurrence of death in a seizure of uncomplicated asthma is practically unknown; nevertheless the symptoms are exceedingly distressing and alarming while the paroxysm lasts. Relief is at times afforded by inhaling the fumes of stramonium, or those arising from burning nitre paper; as a rule, however, the attack has to wear itself out. Much can be done in the way of lengthening the intervals between the seizures by adopting hygienic precautions, by the suitable choice of locality to live in, and by avoiding all those digestive and other troubles which are so apt to induce an attack.

Asti, a town in the province of Alessandria, North Italy, on the left bank of the river Tanaro, 26 miles from Turin. It is large and well-built, and has a station on the line between Turin and Alessandria. A bishop has his seat here, and the cathedral dates from 1248. It was famous for pottery before 400 B.C., when the Gauls destroyed it. In the middle ages it was a powerful republic, and some of the hundred towers that defended it are still in existence. Alfieri was born here in 1749. The district produces one of the most famous of Italian sparkling wines.

Astigmatism, a visual defect due to the reflecting media of the eye not being of equal power in all meridians. Thus, rays in a vertical plane may be brought to a focus before those in a horizontal plane, or *vice versâ*, and consequently the two sets of rays are not capable of being simultaneously focussed on the retina, and blurred images are therefore formed. A slight degree of astigmatism is present in almost all eyes, but sometimes the defect is so pronounced as to seriously interfere with accurate vision, and in that case it is most important that the condition should as far as possible be remedied by the use of suitable glasses.

Astley, PHILIP, the well-known equestrian, was born in 1742. He served with credit in the army, and in 1763 opened a booth for the display of horsemanship in Lambeth, where he built in 1773 the first of his nineteen theatres. He entered the ranks again for a short time in 1794, when the theatre was burnt down, and afterwards, in conjunction with Franconi, established the Cirque Olympique in Paris. He died in 1814.

Astomata, the mouthless Protozoa, viz. the RHIZOPODA and SPOROZOA.

Aston Manor, a suburban district of Birmingham which was erected into a Parliamentary borough returning one member by the Act of 1885. There is a public park opened by Queen Victoria in 1858, and the old manor house is preserved. Pop. (1901), 77,310.

Astor, JOHN JACOB, the founder of the great commercial house in New York and of the Astor Library, was the son of a German peasant, and was born near Heidelberg in 1763. At the age of 20 he emigrated to America, and speedily made a fortune in the fur trade. In 1811 he established the colony of Astoria at the mouth of the Columbia river. Washington Irving made it the subject of one of his popular works. At his death in 1848 he left about four millions sterling. This vast fortune his son William more than doubled, besides being the greatest owner of land and house property in New York. The latter died in 1875.

Astrabad, a town in Persia, at the foot of the Elburz Mountains, and 30 miles south-east of the Caspian Sea. It was once the residence of the Kajar princes, the ancestors of the Shah. Owing to its unhealthiness, the Persians call it "the City of the Plague." The province of which it is the capital bears the same name, and has an area of 5,633 square miles.

Astræa, the daughter of Zeus and Themis, in Greek mythology. She inherited from her mother the duty of asserting justice, and was the last divinity that left the earth when the Golden Age finished in a period of lawlessness and crime. She then took her place in the constellation of Virgo, but Dryden in a famous poem celebrated her supposed return at the Restoration.

Astræa, the type genus of the ASTRÆIDÆ, a family of reef-building corals of the sub-order APOROSA.

Astragalus, a bone of the foot, forming, together with the leg bones, the ankle-joint.

Astrakhan, a government and city of Southern Russia, north of the Caspian Sea and the Caucasus. Originally a province of the Mongol Empire, it was conquered by Russia in 1554. Most of its surface

is covered with barren plains and salt lakes, but the banks of the Volga are fertile enough. The population in 1907 was 1,177,600. The city of Astrakhan stands on an island in the Volga about 30 miles from its mouth. The sheepskins are noted in commerce; the fisheries are highly productive, and there is a large trade with Persia and the East in furs, silk, shagreen, iron, etc. It is the seat of both an Armenian and a Greek Archbishopric.

Astral Body, the term applied by Theosophists to a body of pure ether, clothing the vital principle of man, and the exact counterpart of his human body in appearance, which adepts are said to be able to project to any distance in space, thus accounting for the stories of bilocation (q.v.); a ghost, a double.

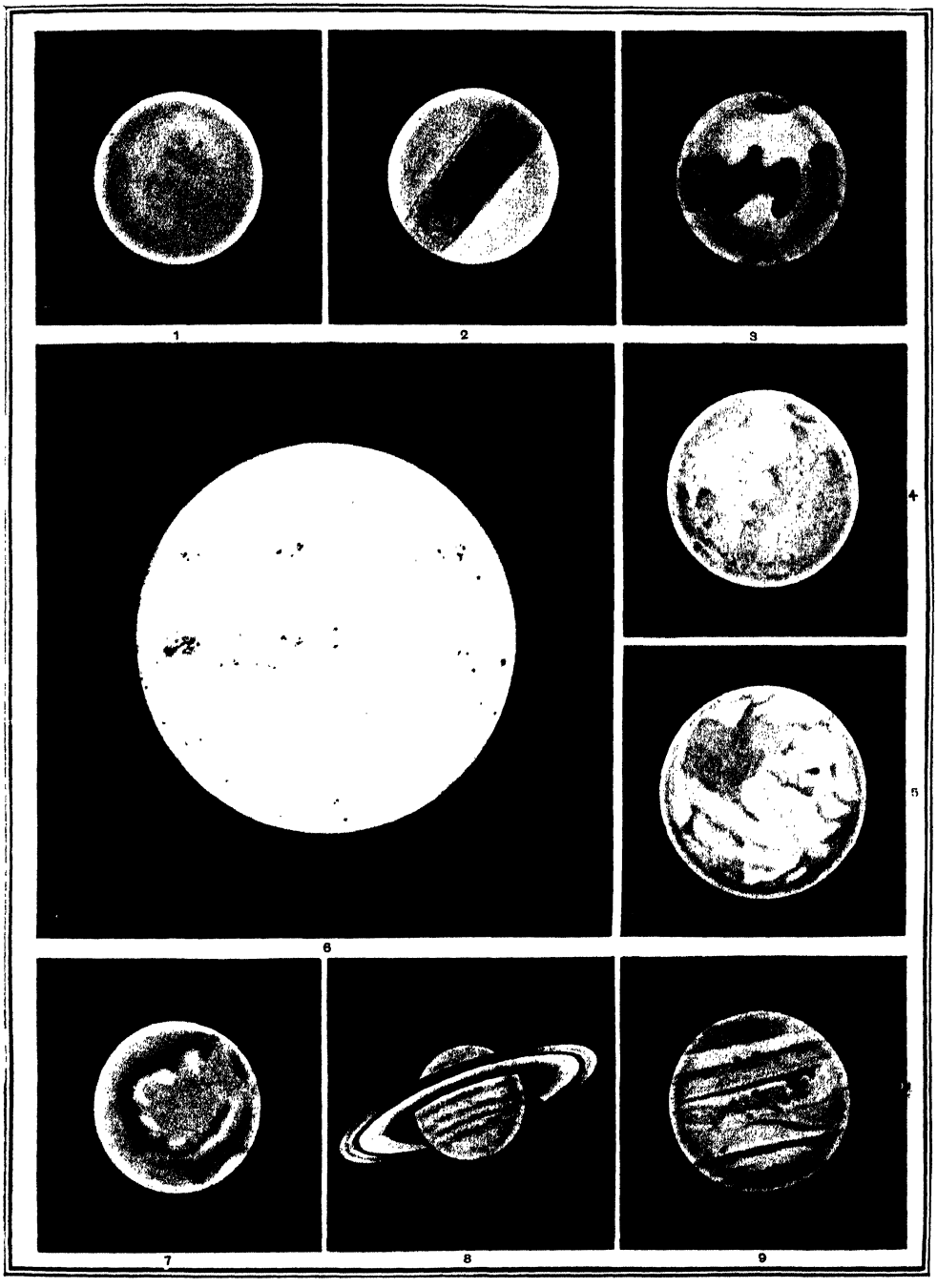
Astral Spirits, spirits believed, in mediæval times, to people the heavenly bodies. They were variously conceived as fallen angels, as the souls of dead men, or as spirits originating in fire, and hovering between heaven and earth or earth and hell. The term astral spirit is used by Theosophists to denote the principle of life.

Astringents, drugs which possess the power of diminishing the secretion from mucous membranes. The most important of these are certain metallic salts, such as alum, perchloride of iron, sulphate of copper, acetate of lead, nitrate of silver, and certain vegetable substances such as catechu, kino, and tannic and gallic acids.

Astrolabe, an ancient instrument formerly used for taking the altitude of a star or any other heavenly body. It was eventually superseded by the quadrant (q.v.).

Astrology (Greek *astron*, star; and *logos*, discourse) is related to astronomy as alchemy to chemistry. In the infancy of our race, before the human mind learned to distinguish between the phenomena of inner consciousness and those of the external world, observers attributed to the material universe the volition and passions, the mental and moral powers possessed by themselves. Hence arose the first impulses of natural religion and the confused collections of false analogies that preceded the elaboration of the several sciences. The sky, the sun, the moon, and the other heavenly bodies became necessarily the earliest and most universal objects of speculation. In the East, where the presence and power of these phenomena were constantly appealing to the senses, their spiritual and moral influence obtained the readiest recognition. The Chinese, the Hindus, the Semitic nations, the Egyptians, the primitive Greeks, the Etruscans, all in different degrees exhibited this phase of development, and either left it behind or were arrested at one stage or another. In one case crude fire- and nature-worship would be the result. Elsewhere the deification of nature took a wider and subtler form. Among the monotheistic Semites a belief in the mysterious connection between the signs of the sky and the destinies of man grew up side by side with religious faith. As in the case of alchemy, long observation led to the discovery of some true laws and principles and to the registration of certain recurrent changes, but priests, professors, or charlatans hid away their knowledge in unintelligible words and symbols, the motives of the concealment being power or profit. So far as the civilisation of Europe is concerned, the systematised error and superstition known as astrology were not of home growth, but were imported in the main from Chaldæa or Arabia, though the cosmogonies of the Greeks, the divinations of the Etruscans, and the mysteries borrowed from Egypt and Persia had prepared the soil for them. The chief ideas that governed the elaborate scheme as it loomed forth on the dark ages may be thus summarised:—By a process of anthropomorphism to each of the planets there were assigned certain human characteristics, the sun and the moon holding higher positions in the scale. Each sign of the zodiac had also its distinct moral attribute. The celestial sphere was divided into twelve sections termed houses, measured off upon the ecliptic. It will be obvious that the constellations and planets appear from time to time in different divisions, and in different combinations. The houses themselves possessed varying powers, the strongest being the compartment just about to rise above the horizon at any moment, and termed the *ascendant*, whilst that just rising was called the *horoscope*. Moreover, all natural objects, plants, animals, minerals, and even countries were symbolically connected with this or that celestial body. Here, then, we have ample materials for the prediction at any given point of time from the aspect of the heavens of the course of future events. Adepts, too, were not above changing their rules to suit the occasion, and brought to their task considerable political and personal knowledge, so that with the use of ambiguous and technical verbiage they not unfrequently hit the mark, and still more often produced the effect desired by their patrons. The system which we have briefly sketched had many outgrowths and amplifications which it is impossible to trace out here. So long as astronomy had not assumed the consistency of a science, men of undoubted intellect and honesty failed to free themselves from the bonds of superstition. Tycho Brahe, Kepler, La Bruyère, and Beza, nay, even Francis Bacon himself yielded to the fascinations of mystery. Copernicus struck the death-blow of error when he proved the sun and not the earth to be the centre of the solar system, but the folly of ages was not to be cured by the first touch of truth. In England, Swift's satire on Partridge did more to discredit charlatanism than any scientific exposition. But Napoleon professed a belief in the stellar influence; Zadkiel's Almanac flourishes to this day; and there still exist obscure professors ready to cast horoscopes for a trifling pecuniary consideration.

Astronomy, the science which treats of the heavenly bodies. *Spherical astronomy* is purely mathematical, and treats of the apparent and real positions of the heavenly bodies in the celestial sphere, including the calculation of their past or future positions, their distances and magnitudes.



ASTRONOMY.

1. URANUS. 2. MERCURY. 3. VENUS. 4. THE MOON. 5. THE EARTH (SUMMER SOLSTICE).
6 THE SUN (SHOWING SPOTS AND PROMINENCES). 7. MARS. 8. SATURN. 9. JUPITER.

D

Nautical astronomy is an application to the needs of navigators for the determination of position on the earth by means of the configurations in the celestial sphere. *Physical astronomy* discusses the forces which cause motion, the analysis and composition, early history, and development of the heavenly bodies. [SPECTRUM ANALYSIS.] The sun is the centre of a system of planets travelling round it, all of them very nearly in the same plane. One of these is our earth. Each planet has its year, or period of revolution round the sun, and its day, or period of rotation about its own axis. The axis of a planet does not remain fixed in direction, but "wobbles" slowly, like the axis of a spinning top. This wobbling is called precession (q.v.).

Some of these planets have satellites of their own. The earth's satellite is the moon (q.v). Saturn (q.v.), besides having ten moons, has a very remarkable ring round it—the nature of which will be discussed separately. When the moon intervenes between the earth and the sun, part of the latter is obscured, and we have a *solar* eclipse. If the earth's shadow falls on the moon we have a *lunar* eclipse. When the space between earth and sun is traversed by another planet we have a *transit*. The transits of Venus are of very great importance in the accurate estimation of the sun's distance from the earth—about 92,000,000 miles being its mean value. The variation of the sun's distance, together with the obliquity of the earth's axis to its ecliptic or plane of motion round the sun, determines the *seasons*. The attraction of the moon and sun on the waters of the earth produce *tides*, which are of greater or less extent as the sun and moon act in conjunction or oppose each other's effects.

Besides our sun, there are innumerable other suns in the universe, *i.e.* the stars, but at such tremendous distances that they are but points in the heavens even when viewed with the largest telescopes. The stars were fancifully arranged into constellations by the ancients, and for convenience the old names are still employed in classification. Hundreds of stars have been found to be double, *i.e.* they exist in pairs, each pair revolving about the common mass-centre, like chain shot, but with only the immaterial link of gravity keeping them together. Finally, we have *nebulæ*, some consisting of matter in a gaseous state, others composed of immense aggregations of stars resembling faintly luminous clouds, and requiring telescopes of high power to resolve them into individual stars. The Milky Way is an example of the latter.

Astronomy was studied by the ancients to a considerable extent. The Chinese are said to have recorded a conjunction of Saturn, Jupiter, Mars, and Mercury with the moon, which phenomenon took place B.C. 2500. The Indians were able to calculate eclipses, and certain observations of the Chaldean astronomers have been proved to be true by recent calculations. Aristarchus (260 B.C.) taught the double motion of the earth round the sun and round its own axis. Hipparchus determined the eccentricity of the earth's orbit, the length of the solar year, noted the precession of the equinoxes, and started a catalogue of stars The Ptolemaic system (q.v.) was propounded in the second century; it regarded the earth as the centre of the universe, round which revolved the sun, moon, and planets. It held sway till the time of Copernicus in the sixteenth century, who taught that the sun was the centre of our system. Then Kepler, chiefly by means of the observations of Tycho Brahe, arrived at his three laws of planetary motion (q.v.). Newton gave the world his theory of gravitation and the laws of motion, and from that time to the present, chiefly on account of the advance in optical science and the consequent development of the telescope, astronomical discovery has progressed to an amazing extent.

Astropectenidæ, a family of STARFISH without anus, but with pointed tube feet, large marginal plates, and internal plates supporting the ambulacral plates. The type genus is *Astropecten*, which is first found in the jurassic rocks.

Astrophyton, the Medusa-head Star, a genus of BRITTLESTARS with very flexible and branching arms.

Astropyga, a genus of SEA URCHINS, with a flexible test, and sometimes an extra number of interambulacral plates; these features are remarkable from their occurrence in the oldest known Sea-urchins.

Astrorhiza, one of the genera of FORAMINIFERA, having the test composed of grains of sand, etc. It is the type genus of the family *Astrorhizidæ*.

Astruc, JEAN, a noted French physician and Biblical critic. He was born in 1684, and in 1731 was appointed professor of medicine in Paris. He was the author of many medical works, but his book dealing with the Pentateuch is that which principally entitles him to reputation. He died in 1766.

Astur, a genus of raptorial birds, of which the goshawk (q.v.) is the type.

Astura, a small town in Italy at the mouth of the river of the same name, and 40 miles from Rome. There is a small harbour, and a tower is believed to mark the site of Cicero's villa where he was killed by Antony's order. Conradi, the last of the Hohenstaufens, was captured here in 1268 after the battle of Taglicozzo.

Asturias, one of the ancient provinces of Spain, now named Oviedo after its capital. It stretches along the north coast, forming the south shore of the Bay of Biscay, and is bounded south by Leon, east by old Castile, west by Galicia. Its area is 4,091 square miles. The coast districts are flat, but the country rises inland towards the range that takes its name from the province, and is broken up by rugged mountains and deep valleys, the highest peaks being 11,000 feet above sea-level. The broader openings produce maize, figs, olives, grapes, cider, and oranges, and pasturage is abundant. The horses and mules are highly valued. Fish, coral, and amber are plentiful on the coast, but want of secure harbours cramps

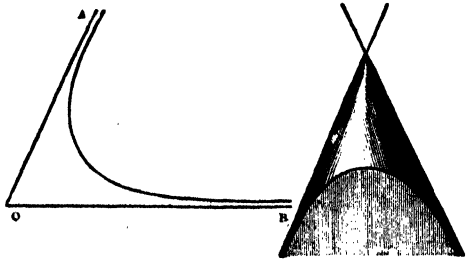
these industries, and impedes the development of mineral resources. Asturias has been the cradle of the Spanish monarchy, and the heir apparent has since 1388 taken his title thence. During the Moorish invasions the Gothic kings found refuge in these mountain strongholds, and in 761 Froïla, son of Pelagio, established at the capital of Oviedo the monarchy of Asturias. The only other towns of importance are Gijon and Aviles.

Astyages, son of Cyaxares, was the last king of the Medes, his reign extending from 594 to 559 B.C. He married a daughter of Alyattes, King of Lydia, and his daughter Mandane became the wife of Cambyses, the Persian, whose son Cyrus, according to Herodotus (i. 107, sq.), deposed his grandfather and seized the throne. However, Xenophon tells another story, and affirms that Cyrus succeeded in the ordinary course to his uncle, Cyaxares II., who died without issue.

Asuncion. [ASSUMPTION.]

Asylum. [LUNACY.]

Asymptote, a line that approaches indefinitely near to a curve as the two are produced indefinitely.



HYPERBOLA (showing *Asymptotes*).

It is therefore a tangent to the curve at infinity, as O A or O B. A surface is regarded as asymptotic to another if it satisfies a similar condition to the above.

Asyndeton (Gk. *not joined*) in *Grammar*, a figure in which the connecting words are omitted. It is used to give increased force to the statement.

Atacama, a district on the west coast of South America, belonging partly to Bolivia, partly to Chili. Cobija is the capital of the Bolivian portion, and Copiapo that of the Chilian province, which is by far the richest. The country possesses an inexhaustible supply of copper, silver, and other metals, including gold. The particular variety of copper ore known as *Atacamite* takes its name hence. The area of the district is about 110,000 square miles.

Atahualpa, the last of the Incas, in 1532 obtained complete possession of the kingdom, it having been formerly divided between himself and his brother. In 1533 he was captured by Pizarro (q.v.) and executed.

Atalanta, the daughter of Schœneus, King of Scyros, was, according to Greek legend, famous for her swiftness of foot. She promised to give her hand to any one who could outrun her, on condition that all defeated candidates should suffer death. Undeterred by the fate of previous suitors, Hippomenes entered the lists, but Aphrodite had furnished him with three golden apples which he dropped one by one when he felt himself hard pressed. The maiden delayed in order to pick up the rolling gold, and was beaten, but took her defeat very kindly. Mixed up with this heroine is another Atalanta of Arcadia, who, exposed as an infant on Mount Parthenius, was suckled by a she-bear and became the mother of Parthenopæus. Milanion was the name of her successful suitor.

Atavism, the appearance in an individual of some peculiarity which was present in a more or less remote ancestor, but which has "skipped" at least one generation. Atavism is of not uncommon occurrence in disease. Thus a child may suffer from asthma, while neither of its parents was ever similarly afflicted, but the disease was present in one of the grandparents.

Ataxy, LOCOMOTOR, a disease in which the co-ordination of movements is impaired, producing among other characteristic symptoms a staggering or "ataxic" gait, and a difficulty in maintaining the equilibrium of the body. The affection was first described and named in 1858 by Duchenne. The morbid process affects mainly the spinal cord, and was at one time confused with paralysis. The affected limbs, however, possess plenty of muscular power, but it is not so harmonised and directed by the nervous system as to produce natural movements. Locomotor ataxy is of insidious onset, and when once typically developed usually lasts till death, though it does not in itself as a rule tend to shorten life. Besides the impairment of movement, there are frequently present the so-called "lightning pains," certain ocular phenomena, and an absence of the knee-jerk (q.v.). Locomotor ataxy rarely commences before thirty years of age, though a disease of a somewhat similar though not identical character is sometimes met with in children, and from its occurring in families is known as hereditary ataxia.

Atchafalaya (Ind. *lost river*), a channel which conveys the waters of the Red River, and, in floods, of the Mississippi also, into the Gulf of Mexico. It passes through Lake Chetimaches, and has a course of 220 miles.

Atcheen, or ACHEEN, once a rather important kingdom occupying the north-west extremity of the island of Sumatra. The natives are physically and intellectually superior to the rest of the Sumatrans, and for many years held the Portuguese at bay, while in 1874 the Dutch endeavoured to establish a footing in the country. They are mostly Mohammedans. The chief products are spices, pepper, betel-nuts, sugar, and rice. Formerly the East India Company had a factory here. Atcheen, or Khota Raja, the capital, is at the mouth of a river between two high ranges, at the north-west point of the island, near Acheen Head. The ground is swampy, and the houses are built on bamboo piles. The inhabitants of the country number over half a million; but the city has been nearly depopulated by war.

Atchison, a city of Kansas, U.S.A., an important railway junction. There is considerable trade.

Ate, in Greek mythology the daughter of Zeus, and the goddess of strife and mischief. She caused so much annoyance in Olympus that her father banished her to earth, where her presence was productive of great misery. Homer (*Il.* xix. 91) and some tragic authors regard her as the spirit of vengeance or retribution for guilty rashness, and describe the kindly daughters of Zeus, the Litai (Prayers), as dogging her footsteps and counteracting her evil deeds. It is not easy to separate her functions from those of Ara and Erinys. The abstract noun, of which she personifies the meaning, is never found in any prose writer.

Ategerat, or ADIGERAT, a town in the Agame province of Abyssinia, near the north-west frontier and on an eminence close to Mount Alewka. It was formerly the residence of the rulers of Tigré, but is now almost in ruins.

Ateles. [SPIDER-MONKEY.]

Atelestasis, the condition in which the natural expansion of the lungs or of a part of the lung does not occur at birth, but the fœtal unexpanded condition persists.

Ateliers (Fr. *workshops, studios*), the name given to a number of workshops which were established in 1848 by the French government, and styled *ateliers nationaux*. They were found to be impracticable, and were soon abolished.

Atellanæ Fabulæ, a kind of light farce performed by Roman citizens of noble birth, introduced very early into Rome. They were of a distinctly broad nature.

A tempo, in *Music*, a direction indicating that the original time is to be resumed after any change has been made.

Athabasca, a river and lake in British North America. The former, also known as Elk river, rises in the Rocky Mountains near Mount Brown, flows north-west, then north, and discharges itself into the south extremity of the lake. Continuing from the northern side of the lake the river then becomes known as the Peace River, unites with the Slave River, and discharges into the Polar Sea. Total length, 600 miles. The lake has a length of about 230 miles, and an average breadth of 20 miles.

Athabascans form a small division, numbering only about 300, of the Athapascans, and are considered to be the tribe from which the stock name is derived. The Athapascans are the most widespread division of the North American aborigines, their domain stretching from Alaska to North Mexico. The name is taken from Lake Athabasca, around which the original stock had their homes. This great aggregation of tribes may be divided into the Northern (*Tinneh* or *Dené*), the Pacific (not numerous), and the Southern (including the Apache group) Divisions, and also a small section, the Kiowa. The more important of these groups are the Kenais and Atnahs (Nehannes) of Central and South Alaska; the Kutchins or Loucheux between the Upper Yukon and Lower Mackenzie rivers; the Chipewyans with the Beaver, Slave, Dog-rib, Hare, Yellow-knife, Sheep, and other tribes, between the Rocky Mountains and Hudson Bay north of the Churchill river; the Takullies or carriers of North British Columbia and eastwards to the Mackenzie; the Umpquas of Oregon; the Tlaskanais of the Lower Columbia; the Hupas of California, and the Apaches of Arizona and North Mexico. The various groups differ considerably in their physical and mental qualities, some being typical Redskins, fierce and untamable, others of a low and somewhat degraded appearance, timid and servile; but all speak more or less closely related forms of the same Athapascan language, which shows but slight affinities with any other native tongues. It is spoken in its greatest purity by the Chipewyans of Lake Athabasca, who are in every way the most important members of the family, and who are not to be confounded with the Algonquin Chippeways of the Laurentian lacustrine region. The Athabascan section are mainly hunters and trappers, and most of them find employment as such in the service of the Hudson Bay Company. *See* M. Petitot's *Année Géographique*, and also F. W. Hodge's "Handbook of American Indians" (1907).

Athaliah, the wife of Jehoram, King of Judah. After the death of her son Ahaziah she slew all the male members of the royal house, except Joash, her youngest grandson, who escaped, and six years later (878 B.C.) asserted his rights, and put her to death (2 Kings xi.; 2 Chron. xxii.). Her history is the subject of a French tragedy by Racine, and has been musically treated by Handel and Mendelssohn.

Athanaric, a Gothic king in Thrace during the fourth century A.D. He was compelled by Valens to abandon his encroachments on the empire, and was subsequently driven by the Huns to seek refuge in Constantinople, where he died in 381.

Athanasian Creed, a statement of the orthodox faith of the Church, not, however, the work of Athanasius, but of a Latin author of the fifth century, possibly either Hilary of Arles or Victricius, Bishop of Rouen. The name, however, has been justified on the ground that the creed states the faith maintained by St. Athanasius against the ARIANS (q.v.). The Church of England orders the Creed to be said or sung on certain festivals. The Disestablished Church of Ireland and the Protestant Episcopal Church of the U.S.A. have, however, abandoned the practice. The so-called "damnatory clauses" have often excited discussion.

Athanasius, the most illustrious of the Greek Fathers, was born at Alexandria about 296 A.D. He was protected by Alexander, the Bishop of Alexandria, and as a deacon took an active part in combating the views of Arius at the Council of Nice. In 328 he was chosen Bishop in succession to Alexander, but the Arians resisted his appointment by fair means and foul, till in 327 a council held at Tyre deposed him, and Constantine banished him to Trèves. Constantine II. restored

him, and again he was expelled by two councils at Antioch. He now went to Rome, and found a friend in Constans, who induced his brother, Constantius, after the vote of councils held at Milan and Sardica, to reinstate the persecuted bishop (349 A.D.). After the death of Constans he was driven out once more, and sought refuge in the Thebaid, where he began the composition of his works. Julian's accession permitted him to return to Alexandria, but he had again to fly into hiding. During Jovian's reign he resumed quiet possession of his see, and though Valens exiled him for a short time, he spent the last ten years of his episcopacy in comparative peace, dying in 373. His works consist mainly of treatises and orations in support of the doctrine of the Trinity and the Incarnation, opposing the heresies of Arius and his followers. The Athanasian Creed was not composed by him, but was either the production of Hilary of Arles in the fifth century or of Spanish theologians of a later date. [ARIUS.]

Athecata, the sub-order of HYDROZOA, in which there are neither *Hydrothecæ* nor *Gonothecæ* (*i.e.* cups for the protection of the polypites or feeding members of the colony, or for the gonophores or reproductive members). It is synonymous with Gymnoblastea.

Atheism (Gk. *a-theos*, without God), the belief that no God exists; frequently confounded with AGNOSTICISM and PANTHEISM (q.v.).

Atheling, an Anglo-Saxon title of honour, usually applied only to those of royal blood, but later extended to any of noble birth. It was first conferred by Edward the Confessor on Edgar, his grand-nephew.

Athelney, THE ISLE OF (Ang. Sax. *Royal Island*), a swampy tract at the junction of the rivers Tone and Parret in Somersetshire. Here Alfred the Great found a refuge from the Norsemen, and established (A.D. 888) a Benedictine Abbey, of which no traces are left.

Athelstan, or ÆTHELSTAN, born 895, succeeded his father Edward the Elder in the Saxon monarchy in 925. He first adopted the title of "King of the English." By his marriage with the sister of Cytric he established a claim to Bernicia, which he annexed. Constantine of Scotland supported a grandson of Cytric, and whilst Athelstan was engaged in upholding Louis d'Outremer, an insurrection broke out in the north with a view to restoring Danish power. This scheme was crushed by the great victory of Brunanburh, near Beverley, in 937. In 940 Athelstan died. He was a wise and temperate monarch, who introduced several important judicial and social reforms.

Athena (Gk. *Athene*, in Homer always *Pallas Athene*; also called *Athenaie* and *Pallas Athenaie*, which makes it probable that the word is adjectival), in Greek mythology the goddess of wisdom, war, and skill in the useful arts, statecraft, agriculture, weaving and needlework. One tradition represents her as springing armed from the brain of Zeus. Herodotus and others regard her as the child of Poseidon and Tritonia. Athens was under her special care, and was the chief seat of her worship. [ACROPOLIS.] She had the credit of founding the Areopagite Court, and of pleading before it in favour of Orestes. The olive was sacred to her as being one of her most precious gifts to man. Amongst animals the owl, the cock, and the serpent were her chief favourites. She lent the Greeks her powerful aid in the Trojan war. The Panathenaia, her great festivals at Athens, were celebrated yearly on a small scale, and once in each Olympiad with greater splendour. She was a virgin deity, and is usually represented with helmet, shield, spear, and coat-of-mail. The Romans identified her with their Etruscan goddess Minerva, who possessed similar attributes.

Athenæum (lit. *the temple of Athene*), anciently an institution built by Hadrian and consecrated to Athenê, which was much frequented by poets and literary men. The term is now applied to any establishment founded for the purpose of encouraging literature or art, to which is often attached a reading-room or library.

Athenæus, a Greek rhetorician and grammarian, born at Naucratis in Egypt about the beginning of the third century A.D. Only one work of his has come down to us, and that unfortunately in an incomplete state. It is called *Deipnosophistæ*, and is a rambling account of a dinner party of learned and witty people, who discuss a hundred topics, and interlard their talk with references to and quotations from many authors known to us otherwise only by name. Casaubon devoted his erudition to editing this book.

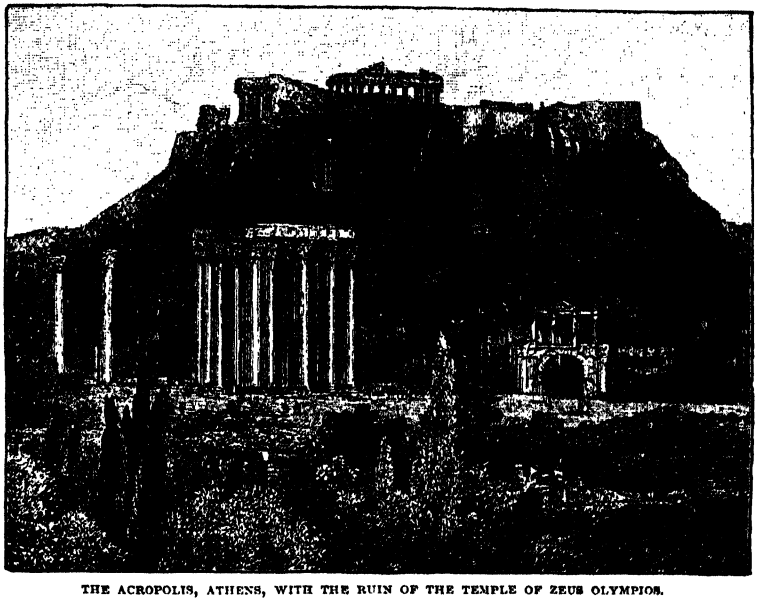
Athenagoras, an Athenian philosopher who embraced Christianity at Alexandria, and wrote an *Apology* for that faith, and a *Treatise on the Resurrection of the Dead*. The first work is dedicated to Marcus Aurelius and Commodus, which would fix its date approximately at 170 A.D. Some critics assign it to the period of Hadrian. No reference is made to the author by any contemporary.

Athenais, or EUDOXIA, the learned daughter of Leontius, an Athenian physicist. Her father having bequeathed his fortune to his two sons and left her penniless, she went to Constantinople in order to put her case before Theodosius II. The Emperor's sister, Pulcheria, struck with her beauty and talent, converted her to Christianity and induced Theodosius to marry her. After a time he suspected her of infidelity and divorced her. She spent the rest of her days at Jerusalem, dying there in 460 A.D. She translated the first eight books of the Old Testament into Greek verse, and wrote a poem on the martyrdom of St. Cyprian.

Athens (in Gk. Ἀθῆναι), the capital of Greece, a city of about 100,000 inhabitants. It is situated towards the S. of the plain of Attica, about five miles from the Saronic Gulf, between the two streams Cephissus and Ilissus, with the mountain of Hymettus to the E., and that of Pentelicus to the N.E. The modern city lies between the rock of Lycabettus and the Acropolis.

The history of Athens goes back to mythological times. In the beginning the Acropolis was all the

city, which was then called Cecropia, after Cecrops, its founder. Cecrops I. was therefore the first king of Athens, so termed. He is supposed to have reigned about 1580 B.C. The city was then fenced with wooden palings. Caves in the rocks W. and S.W. of the Acropolis still exist, and are conjectured to have been the dwellings of these first Pelasgic Athenians. One of them is now called the prison of Socrates, though upon no exact evidence. According to the legend, King Theseus in the 13th century B.C. united all Attica in one state, named



THE ACROPOLIS, ATHENS, WITH THE RUIN OF THE TEMPLE OF ZEUS OLYMPIOS.

the city Athens, and instituted the Panathenaic festival. With the death of Codrus about 1100 B.C. began the reign of archons instead of kings. Gradually the city became democratic. Three centuries later the archons were elected every ten years instead of for life, and in 684 they were elected annually. In 624 Draco was archon. His code of laws is proverbial for its severity, all offences being punished with death. The recently discovered MS. of Aristotle proves him to have been the founder of Athenian democracy. The archon Solon (594 B.C.) repealed many of Draco's laws, and drew up a scheme of constitutional reform which reorganised the financial system, and much extended the franchise. He had previously carried the *Seisachtheia*, a measure relieving the poor peasant-farmers from the servitude they had incurred by their inability to pay the arrears of rent and interest due to the land-owning nobility. After Solon, Pisistratus seized the government by a *coup d'état*, and, though twice successfully opposed and expelled, ruled despotically for seventeen years in all. His reign was a good time for Athens—"peace was preserved, public works constructed, agriculture encouraged, justice enforced." His sons Hipparchus and Hippias were not so successful. The former was killed by Aristogeiton, and the latter, being driven from Athens in 510 B.C., took refuge in Persia. Thanks in part to him King Darius sent an expedition against Athens, which was routed by Miltiades in 490 B.C. in the famous plain of Marathon. Subsequently Xerxes sought to avenge this defeat. Athens was sacked twice in two years, and but for Themistocles and the Battle of Salamis (480 B.C.) the Athenian nation would have been exterminated. Athens now became the head of a Hellenic league against Persia. The brilliant era of Pericles may be dated from about 460 B.C. The Parthenon was built. The dramas of Sophocles, Euripides, and Aristophanes were written and represented. Money streamed into the city from dependencies. Luxury and leisure prevailed. The population was at its greatest—100,000 freeborn Athenians, and 200,000 slaves or more. But another reaction followed soon after the death of Pericles in 429 B.C. The Sicilian expedition under Nicias failed deplorably in 412 B.C., and in the agitation that ensued the government was seized by an oligarchy, whose rule soon broke down through internal dissensions. The war with Sparta turned out badly for Athens. In 405 B.C. Lysander, the Spartan admiral, captured the city, and there was talk of razing it to the ground and making its site a pasturage. At Lysander's bidding the Athenians now chose an oligarchy of thirty to rule over them. But the thirty soon became despotic, and used their power for private ends. Hence they were called the "Thirty

Tyrants." Thrasybulus headed a salutary revolution, and for a time Athens continued to flourish. But the Athenians had degenerated in spirit. They were glutted with too much prosperity, and Philip of Macedon at Chæronea, in 338 B.C., was able to beat the combined Greek army, whereby Athens lost her independence. The succeeding Macedonian kings were not hard upon Athens, but they were careful to keep the city in subjection. Demetrius Poliorcetes showed especial favour to the Athenians, who, from gratitude, pretended to worship him as a god until his fortunes began to change. Then they made it a capital offence to have any dealings with him. For this Demetrius was able afterwards to punish them, though he was persuaded by Craterus, the philosopher, not to proceed to extremities against the city. The nature of the Athenians was by this time an astounding blend of sycophantism and aspiration. They wore chaplets of flowers on a report of Aratus's death, to ingratiate themselves with the Macedonians; yet a little later they besought this same Aratus to help them to get rid of the Macedonians. In this entreaty they were successful. Athens now came under the protection of Rome. It was politic of the Roman Senate to leave the Athenians a shadow of independence. Nevertheless, they were taxed and ruled from Rome like any other province of the Republic. Active malcontents were disposed of summarily; otherwise the Athenians had not much to complain of at the hands of Rome until Sulla came upon them. This was in 86 B.C. Athens had sheltered one of the generals of Mithridates, in revenge for which Sulla sacked the city, "and committed so merciless a slaughter that the very channels in the streets flowed with blood." Under the empire, Athens, now in a state of impotence, was treated benignly. A Roman gentleman's education was not reckoned complete unless he had journeyed to the famous city, whence most of Rome's own wisdom had proceeded. With the accession of Hadrian in A.D. 117 Athens seemed likely to have a new lease of splendour. The emperor so loved the city that he gave the inhabitants special privileges, and built many new edifices. Hence the saying, "the city that used to be Theseus's is now Hadrian's." In the third century the Goths overran Attica and took Athens. A significant tale is told of them. "When they had plundered the city, and heaped up an infinite number of books, with a design to burn them, they desisted from that purpose for this reason, viz. that the Greeks, by employing their time upon them, might be diverted from martial affairs." The long winter of Athens' declension and neglect now set in. Its temples fell into ruins, and its old fame was obscured. From the Latin dukes it passed at length by conquest, in 1456, to the Turks, who held it until 1830, when, by the Second London Protocol, Greece was declared an independent kingdom. In 1832 Prince Otto of Bavaria was proclaimed King of Greece, and was succeeded in 1863 by Prince William of Sonderburg-Glücksburg, who still rules as George I., and who has several children to perpetuate his royal line.

The interest of old Athens centres upon the Acropolis, the summit of which is about 250 yards by 100 in area. Here, near the middle, is the Parthenon —"the finest building on the finest site in the world." It was designed by Ictinus, and completed in 438 B.C. Its Doric columns have with age acquired a golden colour, very beautiful with the sunlight upon them. It was dedicated to Athena, and was used as a treasure-house, and also as the temple-in-chief for the Panathenaic festivals. Since the days of Pericles it has served variously as a Christian church of the Greek and Latin faith, as a Turkish mosque, and as a powder magazine. In 1687, during the siege by Venice, a shell exploded the powder in the Parthenon, and many of its columns were wrecked. Later, Lord Elgin obtained permission to take what he pleased from it. The Elgin marbles in the British Museum thus comprise, among other valuables, the frieze of this notable work of art.

The Erechtheum, a temple dedicated to Poseidon, stands near the Parthenon. It is much more ornate than its nobler neighbour. Some of the details of its chiselling are, indeed, masterpieces, copied in every art school in the world. Within the Erechtheum were the salt spring supposed to have been caused by a touch of Poseidon's trident; an image of Athena, said to have dropped from the skies; and the sacred olive produced by her. To this day the Erechtheum is in parts admirably preserved.

These two are the chief buildings of the Acropolis. There are also the temple of the Wingless Victory, the Propylæa, the Odeon of Herodes Atticus, the theatre of Dionysus, and other lesser relics, either on or built in the outer sides of the rock. The Greek Government is now very zealous in preserving all the remains of old Athens in architecture and sculpture. It is a criminal offence to take any such relic out of the country without official sanction, which is little likely to be given.

A few words may be said about modern Athens. It is a well-built, bustling city, with several daily papers, three or four railway stations, and boundless ambition. The royal palace is an ugly, square building, of white marble from Pentelicus, whence also came the material for the Parthenon itself. Some of the private houses of Athens are exceedingly handsome, thanks to the abundance of precious building material. The city itself is stretching fast over the plain towards Piræus, its port, with which it will soon be quite connected by houses. The Athenians do not dress differently from the people of other European capitals; but the number of Albanians and country-folk in their ancient costumes gives colour to the streets.

As a residence, Athens is both healthy and cheap. The prevailing winds are north-east and south-west; these blow for more than two hundred days in the year. The middle of August is the hottest time, and the end of January the coldest, the range of temperature being between about 40° in January to 90° in August. The rainiest month of the year is November. Of diseases, those most fatal in Athens are consumption, pneumonia, typhoid fever, cardiac maladies, and, chief of all, affections of the digestive organs. August seems to be the month with the highest rate of mortality, and the next in order are June, January, and May. February, March, and April have the least mortality. It may be

remarked that the great fast of Lent occurs in February and March; while, on the other hand, the fruits are ripe, or nearly ripe, during May, June, and August, when the mortality is excessive.

Atherine, a name for any fish of the Acanthopterygian family Atherinidæ, and especially for those of the type-genus (*Atherina*). They are small carnivorous fishes, from temperate and tropical seas; many of them readily enter fresh water, and some have been acclimatised in it. The type-genus contains some thirty species, rarely more than six inches long, frequenting the coasts, and living in large shoals—a habit retained by such of the species of the family as have taken to fresh water. All are highly esteemed for food; and from their general resemblance to the smelt they are often called by that name, though the difference may be easily detected from the presence of a small spinous first dorsal fin in the Atherines. Two species (*Atherina presbyter* and *A. boyeri*) occur on the south coast of Britain, and the first is generally known to fishermen and sold as the "Sand Smelt." The genus Atherinichthys is abundant on the coast of Australia and South America. The species attain a much larger size than those of Atherina, and are equally esteemed as food-fish, the best known being *A. laticlavia.*

Atheroma, a diseased condition affecting the walls of arteries and the valves of the heart. The arterial coats become infiltrated with cells, which subsequently undergo fatty degeneration or calcification. The elasticity and resistance of the artery are thus interfered with, and various affections may thence result, *e.g.* aneurism (q.v.), senile gangrene, or, if the cerebral vessels be affected, apoplexy (q.v.). Atheromatous degeneration is almost always present in old persons, but in some subjects it may occur earlier or to a greater extent than in others.

Athetosis, a peculiar form of spasmodic movement affecting the fingers and more rarely the toes, which sometimes follows upon an attack of paralysis. The movements of athetosis differ from those of chorea (q.v.), in that they are much more slowly executed; they cease as a rule during sleep, but at all other times there is an inability to maintain the affected member in one position, whence the name of the condition, athetosis meaning "without fixed position."

Athlete, originally, one trained to take part in the great contests established in ancient Greece and Rome. The principal event in these contests was the *pentathlon*, which consisted of running, leaping, boxing, wrestling, and throwing the discus. A victory in these games was considered a splendid honour, and pensions, statues, and extraordinary privileges were sometimes given as rewards of success. At the present time athletic sports do not hold such an important place in public esteem as in the days of Greece or Rome. There is still, however, a considerable interest manifested in the various branches of athletics, and information will be found under such headings as CRICKET, FOOTBALL, JUMPING, ROWING, SWIMMING, etc.

Athlone, a town in the counties of Westmeath and Roscommon in Ireland, 76 miles from Dublin. The river Shannon divides it into two parts. The castle, founded in the reign of King John, is on the Roscommon side. In 1691 the town was taken by the forces of William III. It is now one of the chief military stations in Ireland.

Athos, MOUNT, or MONTE SANTO, stands at the extremity of the most northerly of the three finger-like peninsulas that project from the coast of Salonika into the Ægean Sea. It is 6,780 feet high, and is covered with monasteries, called hermitages, and chapels, to the number of 900. These are occupied by monks of the Greek Church, and have libraries peculiarly rich in manuscripts. No woman, nor indeed any female animal, is allowed on the peninsula, presumably because of the sin of Eve. Xerxes on his way to Greece cut through the peninsula a channel which can still be traced.

Atitlan, a small town and lake in the interior of Guatemala, Central America. The latter is 24 miles long, and 8 or 10 miles broad, and probably occupies an extinct crater, as its depth exceeds 1,800 feet. The volcano of Atitlan stands on its south shore, with a town at its base.

Atlanta, the capital of Georgia, U.S.A., nearly 300 miles N.W. of Savannah. It is a large and flourishing town, and does an extensive trade in cotton. It has a university and medical colleges.

Atlanta, the type-genus of ATLANTIDÆ, a well-known family of HETEROPODA. It occurs in the warmer parts of the Atlantic.

Atlantes (plural of Gr. *Atlas*), in *Architecture*, figures of men used to support entablatures instead of pillars. They are sometimes called *Telamones.* Female figures used for a similar purpose are called Caryatides (q.v.).

Atlantic Ocean, the name given to that vast body of water that separates the Old World from the New, its north and south limits being the Arctic and Antarctic circles. It thus has a length of 9,000, an average breadth of 2,700, a shore line of over 50,000 miles, and an area of 25,000,000 square miles. The widest stretches from land to land are just under 4,000 miles between Florida and Morocco, or Cape Horn and the Cape of Good Hope, and the narrowest breadth, between Norway and Greenland, is 900 miles, whilst from Cape Rocca to Sierra Leone the distance is 1,700 miles. The depth averages from three to five miles. Off St. Thomas soundings of 23,250 feet have been taken, but south of the Newfoundland Bank there seems to be a much deeper depression. Along the "Telegraphic Plateau" from Cape Clear to Cape Race the mean depth is no more than 11,000 or 12,000 feet, and the ocean becomes shallower as the Pole is approached. This fluid mass is influenced by two great surface currents, viz. the Gulf Stream, which issues from the Gulf of Mexico, at a temperature of from 10 to 30 degrees higher than the surrounding water, and strikes in a north-east direction, passing between Iceland and Norway, and the Equatorial Current, sweeping in the opposite direction

from the African coast to Cape St. Roque, where it divides, one half entering the Caribbean Sea, and the other half taking a southerly direction along the Brazilian coast. A minor current, really a branch of the Gulf Stream, sets from the Azores towards Africa, and, curving round Cape Palmas, reaches the Bight of Benin. It is called the Guinea Current. Cold streams issuing from Davis's Strait and from the Polar Sea meet the Gulf Stream off the American coast in about 50° N. lat. and passing under it find their way to the equator. In the South Atlantic below Cape Horn a counter current to the Equatorial Current has a constant easterly direction. A large space of still water called the Sargasso Sea is enclosed between the Gulf Stream and the Equatorial Current. It is close packed with sea-weeds, especially with the *Sargassum bacciferum*, from which it gets its name. [OCEAN CURRENTS.] The Atlantic, apart from being affected by constant, periodical, and local winds [WINDS, MONSOONS], is liable to heavy gales in the temperate zones, and to cyclones and hurricanes at the equator. Fogs are prevalent at the points where the Gulf Stream meets colder currents, and icebergs drift as far south as 44° N., whilst in the southern hemisphere their range extends as high as the latitude of the Cape. Waves acquire a greater height and mass in this ocean than in any other. Off the Cape of Good Hope they are sometimes 40 feet high and a quarter of a mile broad. In the North Atlantic it is seldom that they exceed 25 feet. [OCEAN ROUTES.]

Atlantis, the name given by Plato and other classical authors to an island which was supposed to exist in the ocean beyond the Pillars of Hercules. Whether it may be assumed that early navigators had brought back tidings of a western land, or whether the unknown country was a mere creation of fancy, we cannot now determine. Bacon adopted the name for his Utopian romance, the *New Atlantis*, which he never completed.

Atlas, a chain of mountains in the north-west of Africa extending from Cape Nun on the Atlantic shore to the Gulf of Sidra in the Mediterranean, thus traversing Morocco, Algeria, Tunis, and Tripoli. It consists of three or four parallel ranges rising stage by stage from the basin of the Mediterranean and increasing in altitude from east to west. The two larger of these ranges are called the Great (N.) and the Little (S.) Atlas. In Tripoli the average height is 2,000 feet, in Tunis 4,500, in Algeria 7,700, but in Morocco Mount Miltsin (anc. Atlas) reaches 11,400 feet, Jebel Tedla 13,000 feet, and Mount Henleb, near the Algerian frontier, rivals these two peaks. Several lateral spurs are thrown out north and south from the main ridges, one of these terminating in Cape Spartel opposite Gibraltar. The entire chain serves as a barrier between the cultivated district on the coast and the barren sands of the interior.

Atlas, in Greek mythology, a personification of the mountain near Morocco, known to us as Mount Miltsin. According to the story, Atlas, the son of Iapetus and Clymena, was King of Mauretania. He took part with the Titans against Zeus, and was by way of punishment transformed into a mountain and condemned to bear the heavens on his shoulders. He was credited with being father of the Pleiades, the Hyades, and the Atlantides. The figure bearing the world on its shoulders was adopted by Mercator as the frontispiece of his first collection of maps, to which he gave the name *Atlas*, subsequently applied to all similar publications. Anatomists use the term to describe the first vertebra of the neck.

Atmosphere, the gaseous envelope which surrounds the earth. It is retained by the force of gravity, though probably it undergoes gradual dissipation into interstellar space. The average composition is as follows, column (*a*) giving the percentage volume, and (*b*) the percentage weight, of the gaseous constituents:—

	(*a*)	(*b*)
Nitrogen	79·02	76·84
Oxygen	20·94	23·10
Carbon dioxide	0·04	0·06

The composition remains singularly uniform all over the earth, a result of the thorough mixing of the gases due to continual air currents [WIND], and to gaseous diffusion [DIFFUSION]. It is an important fact, however, that the air always holds a certain quantity of moisture, which varies very considerably with the locality, the wind, weather, and temperature of the air. [RAIN, HYGROMETRY.] In certain localities may be also found traces of nitric acid vapour, ammonia, sulphuretted hydrogen, and other gases, while solid particles of organic and other matter, in an exceedingly fine state of subdivision, occur everywhere, the importance of which has recently manifested itself in the investigations on the formation of fogs, and on the germ theory.

It will suffice to notice here that the oxygen is needed for the support of combustion, inorganic and organic, which includes the support of all animal and vegetable life. Its chemical activity is partially marked by the neutral nitrogen present, which acts as a diluent. The chief products of combustion of organic substances are water and carbon dioxide gas, whose presence in the air is thus readily explained. The function of carbon dioxide is important, for plants possess the power of decomposing the gas by aid of certain actinic properties of sunlight, and in so doing absorb the carbon for their own sustenance.

Being acted on by the earth's gravitational force, the air has weight and exercises a measurable pressure on any body immersed in it. The accuracy of meteorological forecasts depends to a great extent on careful observations of the variations of atmospheric pressure. The English standard atmosphere is that equivalent to the weight of a column of pure mercury 30 inches in height, or about 14·7 pounds to the square inch. [BAROMETER.] Under this pressure, and at a temperature 60° F., 100 cubic inches of dry air weigh 32·074 grains.

The importance of our atmosphere is obvious. It acts as a medium for the propagation of sound, and as a screen to prevent the too rapid outward radiation of the heat received by us from the sun; to it

the weather phenomena are due, and without it such animals as this earth possesses could not live.

Atoll, a Maldive word meaning a ring-shaped coral-reef, with a central lagoon of calm water, such as Whitsunday Island in the Pacific.

Atom. An atom was thought until quite recently to be the smallest particle of an element, and indivisible. But every atom consists of a combination of infinitely small corpuscles, named electrons, which are in a state of continual activity. Atoms are not conceived to be capable of existing singly; but always in combination with at least one other atom to form a *molecule* (q.v.). If the atoms in the molecule are alike, as with oxygen, mercury, gold, etc., the substance formed by an aggregation of such molecules is called an *element;* otherwise it is a compound. There can be no atom of a compound body, and the term is therefore restricted to the ultimate particles of the elements.

Atomic Theory, the name given to that theory which regards matter as being built up of indivisible particles called atoms, to explain observed chemical facts by assigning certain physical properties to these atoms. The true atomic theory of modern chemistry is due to Dalton and is only a century old, but has done a very great deal to forward the science of chemistry, and to procure powerful allies in physics and mathematics. The theory simply states that matter consists ultimately of atoms of different kinds, that atoms combine with other atoms of like or unlike kind forming molecules, and that matter in bulk, such as our senses perceive it, consists of exceedingly large numbers of segregated molecules.

According to the atomic theory, the atom (q.v.) is the smallest quantity of matter that can exist in combination, the molecule is the smallest quantity that can exist alone, and must, therefore, consist of at least one atom. Mercury and zinc give examples of molecules containing only single atoms; hydrogen, oxygen, nitrogen, and most other elements have two atoms; the ozone modifications of oxygen have three; whilst phosphorus and arsenic possess four atoms to the molecule. If in a quantity of matter all the molecules are alike, the substance is said to be *pure;* if otherwise, we have a *mechanical mixture.* If the constituent atoms of the molecules are all alike we have an elementary substance or *element.* If, while the molecules are alike, they are not composed of like atoms, we have a pure chemical *compound.* The elements as we know them are not infinite in number, hence the available types of atoms are limited. The properties of all atoms of the same type, *i.e.* of the same element, are supposed identical throughout the universe, if under the same conditions. One of the most important physical properties of an atom is its mass, from which indeed Mendeleëff's periodic law of the elements enables us to deduce other properties of the substance. The mass of an atom is reckoned in terms of the mass of the hydrogen atom, which is the lightest known to us at present. The *atomic weight* of an element means therefore the ratio of the weight of its atom to the weight of the hydrogen atom. The following is a table of the atomic weights of the known elements:—

Aluminium	Al 27	Molybdenum	Mo 96
Antimony	Sb 120	Neon	Ne 9·96
Argon	A 40	Nickel	Ni 58·6
Arsenic	As 75	Niobium	Nb 94
Barium	Ba 137	Nitrogen	N 14
Beryllium	Be 9	Osmium	Os 195
Bismuth	Bi 208	Oxygen	O 16
Boron	B 11	Palladium	Pd 106
Bromine	Br 80	Phosphorus	P 31
Cadmium	Cd 112	Platinum	Pt 194·4
Cæsium	Cs 133	Potassium	K 39
Calcium	Ca 40	Radium	Ra 258
Carbon	C 12	Rhodium	Rh 104
Cerium	Ce 140	Rubidium	Rb 85
Chlorine	Cl 35·4	Ruthenium	Ru 103·5
Chromium	Cr 52	Samarium	Sa 150
Cobalt	Co 58·6	Scandium	Sc 44
Copper	Cu 63	Selenium	Se 79
Didymium	Di 142	Silicon	Si 28
Erbium	E 166	Silver	Ag 108
Fluorine	F 19	Sodium	Na 23
Gallium	Ga 70	Strontium	Sr 87·5
Germanium	Ge 72·3	Sulphur	S 32
Gold	Au 196·5	Tantalum	Ta 182
Helium	He 4	Tellurium	Te 125
Hydrogen	H 1	Thallium	Tl 204
Indium	In 113·4	Thorium	Th 232
Iodine	I 126·5	Tin	Sn 118
Iridium	Ir 192·5	Titanium	Ti 48
Iron	Fe 56	Tungsten	W 183·6
Krypton	Kr 80	Uranium	U 240
Lanthanum	La 138	Vanadium	V 51
Lead	Pb 206·4	Ytterbium	Yb 173
Lithium	Li 7	Yttrium	Y 89
Magnesium	Mg 24	Xenon	Xe 128
Manganese	Mn 55	Zinc	Zn 65
Mercury	Hg 200	Zirconium	Zr 90

It will now be seen how the following observed laws of chemical combination may be explained:—

(*a*) The law of *fixity of proportions* in chemical compounds states that every definite pure substance always possesses the same constitution. Thus water always contains eight-ninths its weight of oxygen, with one-ninth of hydrogen. For on the assumption of the atomic theory, each molecule of water contains two atoms of hydrogen united with one of oxygen. Hence, since the percentage composition of each molecule is a constant, that of any number of molecules will also remain the same.

(*b*) The law of *multiple proportions* in chemical compounds states that substances may form different compounds by uniting in fixed proportions, which bear some simple numerical relation to each other. Thus the ratio of the weights of the carbon and oxygen in carbon monoxide are 3 : 4, in carbon dioxide, 3 : 8. So also nitrogen and oxygen unite in different proportions, forming a series of oxides whose constituents are in the ratios $\frac{7}{8}$, $\frac{7}{16}$, $\frac{7}{24}$, $\frac{7}{32}$, and $\frac{7}{40}$. These facts are readily explained. A molecule of carbon monoxide contains one atom of carbon and one atom of oxygen, the ratio of whose weight is $\frac{3}{4}$. The molecule of carbon dioxide contains one atom of carbon with *two* of oxygen; hence the ratio of the constituents is $\frac{3}{8}$. Similarly with the nitrogen oxides, we are led to the belief that two atoms of nitrogen unite with one, two, three, four, and five atoms of oxygen, forming these five different kinds of molecules, whose compositions are therefore closely related to each other.

(*c*) The law of *chemical equivalents,* chemical quantities which are equal to the same thing as regards their power of doing chemical work or of

forming chemical compounds, are equivalent to each other. One gramme of hydrogen will unite with 35·4 grammes of chlorine or with 8 of oxygen. Hence 8 grammes of oxygen are chemically equivalent to 35·4 of chlorine, or two atoms of hydrogen combine with two of chlorine or with one of oxygen; hence two atoms of chlorine are equivalent to one of oxygen, and knowing the respective atomic weights the above numerical relationship may be immediately established. The next two laws given are not directly deducible from experiment, relating as they do to individual molecules.

(*d*) *Avogadro's Law.*—Equal volumes of all gases at the same temperature and pressure contain the same number of molecules, *i.e.* molecules of all gases under the same conditions of temperature and pressure occupy the same space. [MOLECULE.]

(*e*) *Dulong and Petit's Law.*—The atomic weight of an element multiplied by its specific heat is a constant for all elements, known as the *atomic heat*.

These two laws receive full confirmation from the kinetic theory of gases, as advanced by Clausius, Clerk-Maxwell, and other physicists, and afford the most conclusive means of settling the atomic weight of an element.

For an explanation of the system of nomenclature adopted in modern chemistry *see* CHEMISTRY.

Atonement, a "putting at one" or reconciliation of those who were alienated, properly referring to the work of Christ in reconciling fallen man with God. Sometimes, however, in recent times the word has been used as if it meant satisfaction or payment for sin.

Atrato, a river in the United States of Colombia, South America. Rising in a spur of the West Cordilleras, it flows almost due north, and after a course of 200 miles discharges itself by nine mouths into the Gulf of Darien. It is navigable for most of its course, and engineers have proposed to connect it by canal with the S. Juan, which falls into the Pacific, thus providing a substitute for the now practically abandoned Panama Canal.

Atreus, the legendary king of Mycenæ, who succeeded his father, Pelops, married Aërope, and was the father of Agamemnon and Menelaus. To avenge the seduction of his wife by his brother, Thyestes, he killed the children of the latter, and served up their corpses at a banquet given to their father. Ægisthus, another son of Thyestes, killed Atreus, and the Nemesis attaching to the house extended to later generations. [ORESTES.] Sophocles made Atreus the subject of a tragedy which is no longer extant.

Atri (classic *Hadria*), a town in the province of Abruzzo Ulteriore, Italy. It is built on an eminence 26 miles from Teramo and 5 miles from the Adriatic, on which it formerly had a large port. Extensive remains show the ancient importance of the place. It is now the seat of a bishopric.

Atrial System, the pallial sinuses in the BRACHIOPODA.

Atrium, (1) in MEDUSÆ, the cavity into which the mouth opens. (2) In TUNICATA, the cavity around the pharynx into which the anus opens; the aperture by which it communicates with the exterior is called the *atrial pore*. [ASCIDIA.]

Atrium, the hall or most important room in a Roman house in ancient times. It was lighted by means of a large opening in the middle of the ceiling called the *compluvium*, beneath which, in the centre of the floor, was the *impluvium*, designed to catch the rain which fell through the *compluvium*.

Atropas, a genus of HYMENOPTERA; it includes the bookworm *A. pulsatorius*.

Atrophy (*want of nourishment*), the condition of wasting or diminution in bulk which ensues when the body or any part of the body does not receive sufficient nutrient material. A good example is afforded by the atrophy of the fatty tissues of the human body which occurs in starvation.

Atropine ($C_{17}H_{23}NO_3$), the alkaloid obtained from the roots and leaves of the Deadly Nightshade (*Atropa Belladonna*), a plant not uncommon on limestone. It is a powerful narcotic poison, but is extensively used in ophthalmic medicine from its property of contracting the iris, *i.e.* dilating the pupil, of the eye. From its use by the ladies of Venice in the sixteenth century for this purpose the plant was called "bella donna." It is believed to be mutually antidotic with muscarine, the alkaloid of the Fly Agaric (*Amanita muscaria*).

Atropos, in Greek mythology, one of the Fates; the other two were Clotho and Lachesis. She was the one who cut the thread of life; Clotho spun it and Lachesis directed it.

Atrypa, a genus of BRACHIOPODA; *A. reticularis* is a very well-known fossil, remarkable for its enormous range in time.

Atta, a genus of Ants which stores up seeds for the winter, and prevents their germination by gnawing the radicle.

Attaché, one attached to an embassy, usually a junior member of the staff of the ambassador. [DIPLOMACY, ENVOY.]

Attachment is of two kinds: 1. Against the person; 2. Against property (including debts).

1. *Persum.*—An attachment against the person is a kind of criminal process which Courts of Record are authorised to issue. This process is granted in cases of contempt, which all Courts of Record may punish in a summary manner. If a contempt be committed in court by a breach of the peace, defiance of its authority, or an interruption of its proceedings, the offender may at once be attached and punished to a reasonable extent at the discretion of the presiding judge.

Attachment is also used to enforce obedience to the orders of the High Court of Justice, which also may be enforced, however, by committal. "Attachment" is effected by a writ issued by leave of a court or a judge, and directed to the sheriff; whereas "committal" is directed to be made by an order to be carried out by the tipstaff without the aid of the sheriff. The distinction, however,

between committal and attachment in cases of contempt, though formerly of importance, is practically abolished. Under the Debtors Act of 1869, arrest for making default in a sum of money is abolished, with the exception of certain specified offences, of which the most important are: default by trustees ordered to pay sums by a court of equity; and defaults by solicitors in payment of penal costs, or of sums for which they may be liable in the character of officers of the court. Attachment is issued to punish disobedience to the rules or awards of court generally.

2. Attachment of debts is the mode by which sums of money due to an indebted person may be paid direct to his creditor. The person owing the sum of money sought to be so dealt with is called "the garnisher;" there are fine distinctions as to what liability constitutes an attachable debt. For instance, a liability by a third person to indemnify a debtor in respect of unliquidated risk is not considered a debt in such a sense that a creditor may call upon the third person to pay the sum to him instead of to the debtor entitled to the benefit of the indemnity. The order which a creditor may obtain for the purpose of attaching debts due to his creditor is to be obtained on application to a judge at chambers; and the order has the effect of restraining the garnisher from paying over the debt to any person but the creditor.

As to attachment in the Mayor's or City of London Court, *see* FOREIGN ATTACHMENT. "Attachment" referred to on arrest, *see also* ARRESTMENT.

Attainder, that extinction of civil rights and capacities which formerly took place when judgment of death or outlawry was recorded against a person who had committed treason or felony. The consequences were the forfeiture of land and goods and corruption of blood. In case of such a result, neither he, nor his ancestors through him, could transmit an estate of inheritance to any of his sons or other issue. Modern legislation has however by degrees modified this disability, until both forfeiture and corruption of blood finally disappeared under the provisions of the statute 33 and 34 Vict., ch. 23. A descendant may also now trace through an attainted ancestor. The attainder of a trustee or mortgagee does not occasion the lands, etc., to escheat or be forfeited.

Attar, or OTTO OF ROSES, an oily liquid perfume obtained by distillation from the petals of roses, chiefly the Damask Rose (*Rosa Damascena*), cultivated in South France, Tunis, Persia, India, and, for the English market, mainly on the lower slopes of the Balkans, in Eastern Roumelia, where about 4,000 lbs., valued at £60,000, are annually produced. It is largely adulterated with the very similar Oil of Geranium obtained from the Indian grass *Andropogon Schœnanthus*.

Atterbury, FRANCIS, was born in 1662, and after receiving his education at Winchester and Oxford was ordained in due course. He wrote a treatise in support of Luther against papistical detractors. His ability and eloquence were soon remarked, and in 1691, coming to London, he was chosen by William III. as one of his chaplains. He acted as tutor to Charles Boyle, afterwards Lord Orrery, and is believed to have written his pupil's reply to Bentley on the *Phalaris* question. But though dexterous and showy, Atterbury was no match for Bentley in scholarship. He next engaged in a controversy with Dr. Wake, who maintained stoutly the royal supremacy in the Church. In 1700 he became archdeacon of Totnes and Canon of Exeter. On her accession Anne appointed him one of her chaplains, and in 1704 he was made Dean of Carlisle. A sermon, in which he depreciated morality as distinct from religion, brought him into collision with Hoadley. Being translated to the deanery of Christchurch he created much disturbance in the University, and just before Anne's death received the bishopric of Rochester with the deanery of Westminster. Casting in his lot with the more violent Tories, he offered at Anne's decease to proclaim King James, and he refused to sign the bishops' declaration in favour of George I. He was not unnaturally suspected of having a finger in the Jacobite plots, and was arrested and consigned to the Tower in 1722. The House of Lords next year sentenced him to banishment, and he lived until 1731 in Brussels and Paris, mixing in good society, and hatching schemes for the restoration of the Stuarts. His body was privately buried in Westminster Abbey. Atterbury's character has been the subject of much dispute. He possessed brilliant abilities, but lacked depth. He appears to have been induced to sacrifice religious and political principle to personal ambition. His temper was overbearing and tyrannical under opposition, but a polished courtly manner veiled this defect from ordinary observers.

Attic, in *Architecture*, a low storey above an entablature or cornice, sometimes termed an *Attic storey*. The name *Attic order* is sometimes given to small pillars or columns on the exterior of an attic. In ordinary language an *attic* is a room immediately below the roof of a house.

Attica, the country that for nearly a century held the first place amongst the states of ancient Greece, occupied a triangular promontory south of Bœotia and east of Megaris, having the Ægean Sea to the east and the Saronic Gulf to the south-west. The name is probably connected with *acte*, shore. The surface is rugged, the ranges of Cithæron and Parnes making a barrier to the north, whilst Pentelicus, Hymettus, and Laurius, famed for silver mines, spread over a large proportion of the interior. Elatea and Oxea, the highest peaks, attain about 4,600 feet. The intervening plains produce some cereals, but are especially fertile in olives and figs. Much of the soil, however, is thin and poor. Besides affording pasture for sheep, goats, and cattle, the uplands, especially of Hymettus, were famous for honey. The two chief rivers are the Cephissus and the Ilissus, but smaller streams are abundant. The climate is warm, dry, and bright. The manner in which the scattered townships and clans of this peninsula were welded together so as to form a distinctive State must remain a subject of conjecture. The names of Cecrops, Erechtheus, and

Theseus are inseparably connected with this period of Attic history, but nothing trustworthy can be ascertained. We find that early in the seventh century B.C. the country was occupied by Ionian Greeks, governed on oligarchical principles by archons, a senate or boule (*Areopagus*), having Athens for a centre, and organised into four tribes (*phylai*), each containing three Phratries (*phratriai*), and ninety Gentes (*gene*), the Gens consisting of thirty families. Locally the country was divided into townships (*demoi*), which first obtained political importance under Cleisthenes, and politically (probably at a later date) into Naucraries (*naucrariai*). The tribes and naucraries had their prytanes or headmen. How this primitive organisation developed into a democracy, how the popular assembly (*ecclesia*) gradually acquired supreme control of affairs, and how the constitution was modified by the successive reforms of Draco, Solon, Cleisthenes, Pericles, and Ephialtes, will be found described under the heads of Athens and of the above-named statesmen. Attica in the earliest historical times must have had a population of 10,000. In the height of Athenian prosperity this total probably increased to something approaching half-a-million, the large majority of whom were slaves. Apart from artificial classifications the inhabitants fell naturally under three orders—the Pedieis or wealthy landowners of the plains round Athens, the Parali or dwellers on the southern coast, and the Diacrii or poor mountaineers of the eastern or northern cantons. The interests of these sections were often opposed, and under local leaders such intestine struggles affected the early development of the commonwealth. Attica, on the reassertion of Greek independence in 1821, suffered severely, and in the newly-constituted kingdom was united with Bœotia to form a single monarchy.

Atticus, HERODES, an Athenian rhetorician, born about 104 A.D. He was chosen by Antoninus as tutor to Marcus Aurelius and L. Verus, and was also entrusted with the governorship of Greece and part of Asia. Having inherited enormous wealth from his father, he adorned Athens with splendid buildings, notably the Odeon, and restored other cities of Greece. He died in 180 A.D. One specimen of his oratory survives.

Atticus, TITUS POMPONIUS, was born in 110 B.C. of an honourable Roman family. He was educated with Cicero, and from their life-long friendship he derived his fame. Leaving Rome to avoid being mixed up in the struggles between Marius and Sulla, he settled at Athens, where he won his surname by his thorough mastery of Greek. Cicero wrote to him the celebrated series of letters that has come down to us, but not a single reply from Atticus is extant, and his *Annals* have also perished. He appears to have been a man of singularly refined and genial character, having been able to retain the affection of such bitter opponents as Pompey and Cæsar, Augustus and Antony, Cicero and Hortensius. His great wealth and powerful influence were always used to promote concord and diminish the miseries of civil war. He is said to have starved himself to death in 33 B.C. in order to escape the tortures of an incurable malady.

Attila, or ETZEL, born in 406 A.D., succeeded with his brother Bleda in 433 to the joint sovereignty of the Huns, then established in Pannonia. Having first made peace, and then quarrelled with the Emperor of the East, Theodosius II., they overran Thrace and Macedonia, and forced the helpless sovereign into the position of a tributary (446). Attila next procured the murder of his brother, and then collecting a huge army, estimated at half a million, set out for the Rhine. Theodoric, King of the Goths, was the nominal object of his attack, but Valentinian was well aware that his demand for the hand of Honoria would be the pretext for aggressions on the Western Empire. In 451 he defeated the Franks, crossed the Rhine, and advanced as far as Paris. As he was besieging Orleans the united forces of Goths under Theodoric, Romans under Aetius, and Franks under Merowig, beat him back to within a few miles of Chalons-sur-Marne, where a bloody battle ensued in which he was utterly defeated with the loss of a quarter of his horde. On retreat he devastated Northern Italy, and would have taken Rome but for the influence, it is said, of Pope Leo I., but more probably that he found his followers getting weary and enervated. Retiring beyond the Alps he spent some time in reorganising his power, but in an orgy on the day of his marriage with Hilda he broke a blood-vessel and died (453). He was buried in a gold coffin with immense treasure, and to prevent his grave being plundered the slaves who dug it were killed. Attila was a man of strong character, some military talent, and great ambition. His enemies called him "the Scourge of God," and his own boast was that "where his horse passed grass would not grow." At times he showed traits of savage magnanimity, and perhaps he was no worse than his contemporaries. With him the supremacy of the Huns came to an end.

Attock, a town and fortress in the Panjab, British India, situated on the left bank of the Indus, near its junction with the Kabul river, and about half-way between Peshawur and Rawal-Pindi. The Indus has here a breadth of 200 yards and is navigable to the sea, 940 miles distant. It is crossed by a bridge of boats, and by the viaduct of the Northern State Railway. Attock is said to be the ancient Taxila whence Alexander passed into India, Timur and Nadir Shah following the same route. Akbar built the fortress in 1583, and it was occupied by the British in 1849. Now, however, its importance is inconsiderable, as the Khyber Pass is watched from Peshawur.

Attorney, one put in the place or turn of another, or charged with management of his affairs at law. By the Judicature Act, 1873, the expression "attorney" in the sense of the person representing another in an action is abolished, and the title "solicitor" substituted. Attorneys are not admitted to practise in courts, or to transact legal business for another, until they have been

examined, licensed, and sworn by the proper tribunal. It is necessary that they shall have been articled to some practising solicitor in England or Wales, and shall have served for five years, with a reduction of the period of service in certain cases of university students. The final examination is conducted by the Incorporated Law Society.

A technical sense in which the word "attorney" is used is the character of a person named in a legal document empowering him to act for another, to receive debts, to manage estates, or perform analogous duties.

Solicitors are under stringent rules and regulations in conducting their practice. In the United States the term attorney-at-law is retained, and includes the various offices known in England and Scotland as advocate, barrister, counsellor-at-law, lawyer, proctor, and solicitor. [SOLICITORS.]

Attorney-General, the principal counsel of the Crown appointed by patent to hold office during the King's pleasure. He is attorney for the King, and stands in precisely the same relation to him as every other attorney (now solicitor) does to his employer. The addition of the term "general" in the name of the office probably took place in order to distinguish him from attorneys appointed to act for the Crown in particular courts, such as the Attorney for the Court of Wards, or the Master of the Crown Office, whose official name is "Coroner and Attorney for the King" in the King's Bench Division of the Supreme Court. By degrees the office has become one of great dignity and importance. As counsel he is bound to conduct prosecutions and other legal proceedings on behalf of the Crown if required to do so. He also acts as representative of the Crown in matters connected with charities, patents, and criminal proceedings instituted by Government. [INFORMATION.] His functions are, however, political as well as legal, for he is almost invariably a member of the House of Commons, and one of the Ministry of the day, though not of the Cabinet. He is appointed to his office on the advice of the Government for the time being. There is therefore a change of Attorney-General on every change of Government. In the House of Commons he answers questions on legal matters of public interest, and has charge of Government measures relating to legal subjects. The Attorney-General grants fiats for Writs of Error. When the House of Lords sits in a Committee of Privileges it is the duty of the Attorney-General to attend at the Bar, in a judicial capacity, and report on the claim. He also allows applications for patents. All questions respecting precedency of the Attorney and Solicitor-General were terminated by a special warrant of King George IV., when Prince Regent, in the year 1811, by which it was arranged that these officers should have place and audience at the head of the English Bar. A discussion arose in 1834 on the hearing of a Scottish appeal in the House of Lords, upon the question of precedence between the Attorney-General and the Lord Advocate of Scotland, which was finally decided in favour of the former.

The Prince of Wales has an attorney-general, and when there is a Queen Consort she has one also.

In the United States the Attorney-General is a member of the Cabinet. He presides over the Department of Justice, advising the president, etc., on questions of law. He also conducts suits in the United States Courts when necessary, gives legal opinions on behalf of the Government, examines titles to land purchased by the Government for public use, and superintends the proceedings of the Courts.

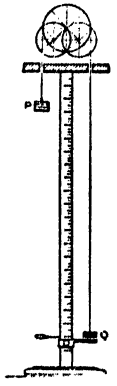
Attraction, the tendency that bodies may have, under certain circumstances, to diminish the distance between them. This tendency, whether due to electricity, magnetism, or ordinary gravitation, seems to require the existence of an intervening medium, though in the last-named case no satisfactory explanation has yet been offered of the way in which the medium is involved.

Attribute, in *Logic*, a term used to denote that which is affirmed of a subject. Thus sweetness may be said to be an attribute of sugar.

Attwood, GEORGE, born in 1745, became fellow and tutor of Trinity College, Cambridge. He was one of the first mathematicians of his day, and wrote several valuable treatises on physics, and was fortunate enough to secure the patronage of Pitt, who conferred on him a sinecure. He died in 1807.

Attwood, THOMAS, an English musician of merit, was born in 1767. After serving in the choir of the Chapel Royal, he studied music under Mozart. He produced several operas of no value, but being appointed organist to St. Paul's and composer to the Chapel Royal, he wrote the anthem, "I was glad," for the coronation of George IV., and another, "O Lord, grant the King a long life," for that of William IV. He died in 1838 whilst engaged on a composition in honour of Queen Victoria.

Atwood's Machine, an instrument for investigating the laws of uniformly accelerated motion. It consists of two unequal masses P and Q, connected by a fine silk thread passing over a pulley. That the friction at the pulley may be negligible, the axle does not rotate on pivots, but just rests on the circumferences of four other pulleys, two each side, as shown in the figure. The difference in the weights of P and Q produces downward motion of the heavier mass, say P, and upward motion of Q. Either mass may be varied while in motion, and the time taken to traverse any length may be recorded by an electric chronograph, water-clock, or other such time measurer. The space traversed is determined by a vertical scale fixed to the instrument. The observations thus taken enable us to determine the laws of such motion, and, indirectly, to determine G, the acceleration due to gravity (q.v.).



ATWOOD'S MACHINE.

Aube, a department in the east of France

comprising the southern part of the province of Champagne, and a smaller portion of Burgundy, and having an area of 2,317 square miles. It derives its name from the river Aube, a tributary of the Seine. The soil is chalky and barren in the N., but fertile in the S., producing wine, hemp, and roots. There are considerable forests, and quarries of building-stone and marble. Troyes is the capital.

Auber, DANIEL FRANÇOIS ESPRIT, the popular French composer, was born in 1782. His father, a well-to-do print-seller, destined him for business, and he went to London as a merchant's clerk. Returning to Paris at the Peace of Amiens, he devoted himself seriously to music, and became a pupil of Boieldieu, and afterwards of Cherubini, still adhering to business. In 1813 he brought out an unsuccessful operetta, *Le Séjour Militaire*. His father having died, he now took up music as a profession, and from 1819 to 1826 produced several comic operas with but moderate appreciation. In 1828 he abandoned the prevalent style of Rossini, and struck out a line of his own in *La Muette de Portici*. His fame was at once established, and then followed a number of charming works of which the best known are *Fra Diavolo*, *Le Domino Noir*, *Le Lac de Vics*, *Les Diamans de la Couronne*, and *Haydée*. In 1842 he was appointed director of the Conservatoire. His style is brilliant and vivacious, though it lacks depth, but his instrumentation shows consummate skill, and no musician possessed a more keen sense of dramatic interest. He wrote an ode for the opening of the London Exhibition of 1862, and his last work, *Le Rêve d'Amour*, appeared in 1870, just before the outbreak of the Franco-German War. He died in 1871, deeply affected by the sufferings of his country.

Aubergine, BRINJAL or EGG-PLANT, *Solanum Melongena*, a native of Asia, now cultivated in Europe; bears a large ovoid, white, yellow, or violet, fruit, which is edible when cooked.

Aubervilliers, a small town in the suburbs of Paris, from which it is about four miles distant to the north. A great fort exists here for the protection of the capital, and the neighbourhood was the scene of many engagements in the Franco-German war. Iron foundries, glass works, and factories for india-rubber, paper, leather, and chemicals are numerous.

Aubrey, JOHN, an eminent antiquary, born of a wealthy Herefordshire family in 1626. He went to Oxford, became later on a student of the Middle Temple, and spent most of his life in London. He joined Harrington's *Rota* Club, and at the Restoration was elected one of the first members of the Royal Society, but having lost all his property by lawsuits and mismanagement, he had in middle life to depend on the kindness of friends, to whom "Old Aubrey's" conversation was a source of delight. He knew Hobbes, Milton, Dryden, Sam. Butler, Boyle, and all the literary men of his day. Many of the lives in Anthony Wood's *Athenæ Oxonienses* were by his hand, and he supplied material to Dugdale and to Blackburn. His own great work was the *Perambulation of Surrey*. Many curious facts are treasured in his *Miscellanies*. His *Architectonia Sacra* and *History of Wiltshire* were not published until after his death, which occurred in 1697.

Auburn, (1) a village in the county of Westmeath, Ireland, about six miles N. of Athlone. It was formerly known by another name, but Goldsmith in his *Deserted Village* having described it as "Sweet Auburn, loveliest village of the plain," the poetical name has clung to the spot.

(2) The capital of Cayuga county in the State of New York, U.S.A., about 174 miles W. of Albany. Here was established in 1816 a great prison on the silent system, where a thousand convicts by their organised labour are said to cover the expenses of their maintenance. There are in the town many factories for cotton and woollen goods, paper, agricultural implements, and ironware, worked by water power from Lake Owasco.

Auch, the capital of the department of Gers, France, about 42 miles west of Toulouse. It occupies the site of the ancient Augusta Auscorum, and stands on the steep slope of a hill above the river Gers, the streets being connected by flights of steps. It is the seat of an archbishopric, and has a fine cathedral begun in 1487. There is a considerable local trade, especially in wine and Armagnac brandy.

Auchenia, a genus of New World ruminants closely allied to the camels, and containing the alpaca, the guanaco, the llama, and the vicugna (see these words).

Auchterarder, a town in Scotland, 15 miles W.S.W. of Perth. The young Pretender burnt it in 1715. A suit in which Lord Kinnoul successfully claimed the right of presentation to the parish in spite of the veto of the parishioners led to the split up of the Established Church of Scotland in 1842, and the creation of the Free Church.

Auckland, the most northern county of New Zealand, occupying about half of North Island, and having a length of 400 and a breadth of 200 miles. The coast line, deeply indented, extends for 1,200 miles, and there are excellent harbours. Mountains, fertile plains, and wooded slopes make up an attractive and diversified country with a climate in some respects superior to that of England. Signs of volcanic action are plentiful in the shape of active and extinct craters, geysers, hot springs, and recent deposits of lava. Of several fine lakes, Lake Taupo (300 square miles) is the largest. The Waikato issuing from it flows north-west, is joined by the Waipa and falls into the sea on the west coast. The Waiho or Thames, the Waitoa and the Piako discharge themselves into the Firth of Thames, an inlet of Hauraki Gulf. The Kaimanawa, Whakatane, and Tewhaite ranges stretch across the southern districts, but few of the summits exceed 2,500 feet. Mount Ikuarangi, the loftiest peak (5,535), is in the eastern peninsula. The chief products are wool, timber (especially Kauri pine), resin, and flax. Minerals, including coal, are abundant, and a good deal of gold has been exported. Auckland, the chief town, was formerly capital of New Zealand, and is now the largest city in the Northern island. It contains many fine buildings, and has a rapidly increasing population.

Auckland, (1) WILLIAM EDEN, BARON, the third son of Sir Robert Eden, was born in 1744. He entered Parliament in 1771, and in 1784 represented England at the French Court, being presently transferred to Spain. In 1789 he was made an Irish peer, and in 1793 received a peerage of the United Kingdom. He was Postmaster-General from 1798 to 1801. A treatise on Penal Law is the chief of his works. He died in 1814.

(2) GEORGE EDEN, EARL OF, second son of the above, was born in 1784 and succeeded his father in 1814, having previously sat for some years in the House of Commons. A steady-going Whig, he served as President of the Board of Trade and First Lord of the Admiralty under Earl Grey in 1830, and four years later was sent out as Governor-General of India. He effected considerable improvements in education, commerce, and internal legislation, but unfortunately was induced to neglect the advice of Barnes, his representative at Cabul, and to resolve on ousting from Afghanistan Dost Mahommed, whom he suspected of intrigues with Russia, in favour of Shah Sujah. Upon this resulted the disasters of 1841–2. Lord Auckland was recalled, and his successor Lord Ellenborough reversed his policy. He subsequently in 1846 returned to his former post at the Admiralty, but died suddenly in 1849.

Auction (Lat. *augeo*, I increase), a public sale in which the price is increased by stimulating competition among the purchasers. In an ordinary auction each bid is an advance on the previous one; in a *Dutch auction* the seller starts with a higher price than he is willing to take, and lowers it till a purchaser is found. In England a "reserve price" may be set on the goods, unless the sale is expressly stated to be "without reserve." Conditions of sale must be previously brought under the notice of the intending purchaser, and are essential to the validity of the sale. The auctioneer (who in the United Kingdom is subject to a licence duty of £10 annually) frequently acts as the agent for intending purchasers who may be absent. He is not liable for the price of the goods unless it has been actually received by him.

Aucuba, a genus of plants, of the order *Cornaceæ*, of which the most common is *A. japonica*, a well-known shrub with glossy green leaves mottled with yellow. The berries are bright red.

Aude (anc. *Atax*), a river and a department in the South of France. The former rises in the Eastern Pyrenees, and discharges itself through marshes into the Mediterranean about six miles from Narbonne, after a course of over 100 miles. Carcassonne is on its banks. The department is bounded N. by Hérault and Tarn, E. by the Mediterranean, S. by Pyrénées Orientales, and W. by Ariège. It has an area of 2,341 square miles. The surface is mountainous, but intersected by rich valleys running north and south. Large lagoons extend along the coast. The agricultural products include wheat, maize, and other cereals, chestnuts, almonds, olives, wine in abundance, and honey. Antimony, manganese, copper, silver, iron, lead, coal, marbles, jet, and lithographic stones are yielded in remunerative quantities, and there are some local manufactures. Carcassone, Narbonne, and Castelnaudary are the chief towns.

Audebert, JEAN BAPTISTE, a French artist who consecrated his talents to science, and executed some magnificent works illustrating natural history. He brought to perfection the art of printing in colours, and his histories of humming birds and of monkeys are unsurpassed. He died in 1800 aged 41, leaving many of his undertakings incomplete.

Audiphone, an instrument for enabling deaf people to hear sounds. It consists of a triangular plate of hardened caoutchouc, which is very sensitive to sound waves, and which is held in contact with the teeth; the sounds are conveyed to the auditory nerves by this means, and not through the tympanum. It was invented in 1879.

Auditor (Lat. *audio*, I hear), a person appointed to examine accounts on behalf of governments, public companies, or private persons.

Audley, THOMAS, BARON AUDLEY of Walden, the son of an Essex yeoman, born in 1488, by talents combined with unscrupulous time-serving raised himself to a high position at the bar. In 1523 he entered Parliament as a supporter of Wolsey, and on the disgrace of the latter became Speaker, 1529. He managed the Parliamentary business connected with the divorce of Catherine, and was made successively Lord Keeper and Lord Chancellor. In 1533 he was accessory to the judicial murders of Fisher and More, and to the other iniquitous proceedings of the Upper House. He was also instrumental in putting to death Anne Boleyn, Courtney, and many others, and for these services was raised to the peerage and received the Garter. In fact he was the willing minister to all the evil designs and passions of his royal master, whose favour he contrived to retain till he died in 1554.

Audouin, JEAN VICTOR, was born in 1797, and educated for the law. In 1816 he became interested in Brongniart's fine collection of insects, and thenceforth devoted himself to entomology, and especially to the practical aspects of that science. He edited *Les Annales des Sciences Naturelles*, was sub-librarian of the Institute, president of the French Entomological Society, and lecturer on that subject at the Musée. About 1830 he worked much with Milne Edwards, writing on the natural history of the shores of France and on the Crustaceæ. By the instructions of the French Government he entered into a minute inquiry as to the nature of the parasites that destroyed the vines, and the diseases of silkworms. He died in 1841.

Audubon, JOHN JAMES, a celebrated American naturalist, was born of French Protestant parents in Louisiana in 1781. After studying in Paris, where he learnt drawing under David, he settled on a plantation in Pennsylvania and married; but, having from boyhood a passion for observing and sketching birds, he for many years took long annual journeys in the primeval forests of the interior for this purpose. Between 1830 and 1839 he published

in four folio volumes his *Birds of America*, described by Cuvier as "the most magnificent monument that Art had up to that time raised to Nature," and his *American Ornithological Biography*, and between 1840 and 1850 devoted himself to similar works on *The Quadrupeds of America*. He died at New York, 27th January, 1851.

Auerbach, BERTHOLD, the popular German romancer, was born of Jewish parents in 1812. After studying theology at Tubingen, Munich, and Heidelberg, he wrote an essay on the *Jewish Nation and its Recent Literature*, and devoted much attention to the doctrines of Spinoza, whose works he translated. In 1843 he discovered the true bent of his genius, and published his *Dorfgeschichten* or *Village Tales*, in which he depicts with marvellous skill the life, habits, and feelings of the peasantry of the Black Forest, his native district. Several charming novels were written by him during the next thirty years, the best of them being *Barfussele* ("The Barefooted Maid"), *Auf der Höhe* ("On the Heights"), *Das Landhaus am Rhein*, and *Brigetta*. He took a deep and patriotic interest in the war of 1870, and composed a history of its origin and circumstances. Numerous little stories from his pen appeared in periodicals, and in 1876 he produced a new series of Black Forest Sketches under the title *Nach dreissig Jahren* ("After Thirty Years"). He died at Cannes in 1882.

Auersperg, ADOLPHUS WILHELM, PRINCE, an Austrian statesman, was born in 1821. After serving in the army he became a member of the Bohemian Diet, and was presently appointed governor of that province. In 1871 the emperor made him Austrian prime-minister, and in that capacity he carried through with success a Liberal and constitutional programme. In 1873 he established the principle of popular election. In 1879 the Slavonic or Autonomist party in the Cis-Leithan Reichsrath was reinforced by the Czechs, who had hitherto held aloof from the Legislature, and the constitutional party found itself in a minority. Auersperg resigned and never again took office, dying in 1885.

Auersperg, ANTON ALEXANDER, COUNT, belonged to the same noble house of Carniola as the foregoing, and was born in 1806. He had a marked talent for poetry, especially for ballads and satires. Under the pseudonym of Anastasius Grün he used his pen against Metternich and the Absolutist party, producing also lyrical pieces of wider interest, and spirited romances in verse such as *Der Letzte Ritter*, *Robin Hood*, *Volkslieder*, and *In der Veranda*. Having for many years taken an active part in provincial politics, he entered the Reichsrath in 1860, and like his more distinguished kinsman fought on the side of progress and popular representation. His death occurred in 1876.

Augeas, a legendary king of Elis, Greece. He was one of the Argonauts, and he possessed 3,000 oxen, which he kept for thirty years without cleansing their stalls. Heracles undertook the task on condition that he should receive a tenth of the herd as his reward. By diverting the river Alpheus he easily got rid of the accumulated filth, but Augeas declined to keep his bargain. The hero accordingly killed him. The cleansing of the Augean stable has become a proverbial expression for any difficult and unsavoury undertaking.

Augereau, PIERRE FRANÇOIS CHARLES, Duc de Castiglione and Marshal of France, was born in 1757. In 1792 he joined the Revolutionary army, and distinguished himself in the Vendée and in the Pyrenees, obtaining in 1794 command of a division. Accompanying Napoleon to Italy he displayed prodigious courage at Lodi, Castiglione, and Arcola, but marred his fame by cruelty and spoliation. He executed the *coup d'état* of the 18th Fructidor (1797), and received command of the army on the northern frontier, but the violence of his republicanism caused his withdrawal. He was appointed to command the army in Holland, and was made duke and marshal (1804), when he subdued the Vorarlberg. He took a leading part at Jena and Eylau; was less successful in Catalonia; commanded a reserve in the Russian campaign, and fought gallantly at Leipsic. In 1814 he was instructed to hold Lyons against the Allies, but he fell back before superior numbers, and never being cordially attached to Napoleon, went over to the Bourbons. His death occurred in 1816.

Augier, GUILLAUME VICTOR EMILE, the able French dramatist, born in 1820, was destined for the bar, but took to writing very early. In 1844 he made his *début* with a most successful satirical drama, *La Ciguë*, and for forty years he supplied the French stage with some of its most brilliant comedies, amongst them being *Gabrielle*, *La Pierre de Touche*, *Le Gendre de M. Poirier*, *Les Lionnes Pauvres*, *Les Effrontés*, *Paul Forestier*, *Madlle. de la Reynie*, *Les Fourchambault*, etc. In several of these he collaborated with Jules Sandeau, and other dramatists. He was elected to the Academy in 1858, and in 1868 became a Commander of the Legion of Honour. He died in 1889.

Augite, from the Greek, *augé*, lustre, is the name of a silicate of calcium, magnesium, aluminium, and iron, closely related chemically to hornblende. It crystallises in the oblique system, is greenish black and sub-resinous, and is an essential mineral in basalts and diabases, being apparently formed by more rapid cooling than hornblende. [BRONZITE, DIALLAGE, PYROXENE.]

Augment, in *Grammar*, an addition used in the Sanscrit and Greek languages, placed at the commencement of particular tenses of the verbs. In Greek it is *é* before a consonant (syllabic), but when the verb begins with a vowel, the vowel is lengthened and usually altered (temporal). In Sanscrit the augment is always *a*. The term is sometimes applied to the German *ge*.

Augmentation, in Heraldry, an additional charge on a coat-of-arms, bestowed by the Crown as a mark of honour.

Augsburg (classic *Augusta Vindelicorum*), a city in Bavaria, Germany, the capital of the circle of Suabia and Neuberg, situated at the confluence

of the Lech and Wertach, 36 miles W.N.W. of Munich. It was founded about 14 B.C. by Augustus, and grew to be one of the most powerful cities in Europe. In 1531 the famous *Augsburg Confession*, on which the Lutheran Church is based, was submitted to the Emperor Charles V. in the cathedral, and in 1555 the *Peace of Augsburg* brought about a temporary understanding between the Reformers and the Romanists. Though not so prosperous as in former days, Augsburg is only second to Frankfort in financial importance. The *Allgemeine Zeitung*, one of the chief political organs in Germany, was published there until 1882. There are manufactories of cotton, linen, silk, watches, mathematical instruments, and large dyeing and bleaching works. The cathedral dates in part from the tenth century; St. Ulric's Church boasts a splendid tower; the townhall is a fine Renaissance building; and the Fuggerei, a group of almshouses built early in the sixteenth century, offers many features of interest. The Maximilian-Strasse is regarded as one of the finest and most picturesque of streets.

Augsburg Confession, a document drawn up by Melanchthon with Luther's approval, signed by the Elector of Saxony and other German princes, and read at the diet of Augsburg, June 25th, 1530. Part I. stated the doctrines of the Reformers, while Part II. enumerated the seven principal abuses complained of in the Roman Church (communion in one kind, clerical celibacy, private masses, confession, the admission of tradition, monastic vows, and indulgences). A refutation, prepared by Roman Catholic theologians, was read at the Diet in September, but not accepted by the Reformers. Melanchthon had meanwhile prepared an *Apology* for the Augsburg Confession (pub. 1531), which is an elaborate defence of and commentary upon it.

Augur (Lat. *avis*, a bird), in ancient Rome a functionary whose duty was to observe and interpret, according to certain rules, the auspices or alleged natural signs of the future—signs in the heavens, in the flight of birds, in the eagerness or disinclination to feed of fowls kept for the purpose of divination, and the like. The college or board of augurs at Rome traced its foundation to Numa, and was eventually increased to 16 by Julius Cæsar. Many distinguished men, including Cæsar himself and Mark Antony, were members of it. The augurs wore the sacerdotal toga, with a broad purple border, and carried a curved rod (*lituus*) which was made use of in their ritual. Their function at the assumption of office by the consuls and other magistrates has given rise to the term "inaugurate."

August, the eighth month of the year, so called by the Emperor Augustus, who gave it his own name, it having been previously known as the *Sextilis*, as it was the sixth month according to the Roman calendar. In England the first Monday in August is always a bank holiday. [BANK HOLIDAYS.]

Augusta, (1) the capital of the State of Maine, U.S.A., stands on the right bank of the Kennebec river, 43 miles from its mouth. It is connected by railway with Canada to the N.E. and the Atlantic states to the S.W. The state house and the arsenal are the chief public buildings. A great fire did much damage to the city in 1865. (2) The capital of Richmond county, Georgia, U.S.A., is a handsome town on the Savannah river, 127 miles N.W. of Savannah, with a station on the Charleston and Milledgeville Railway. The Augusta canal made in 1815 supplies water-power for many flour and cotton mills, and the neighbouring district grows an abundance of cotton and tobacco.

Augusta, a name given by the Romans to many cities in honour of Augustus or some of his imperial successors. In some cases, *e.g.* Aosta, Agosta, Saragossa (*Cæsarea Augusta*), Augst, Augsburg, Aoust-en-Diois, the ancient title survives, but frequently the local or tribal name alone remains as in Soissons (*Augusta Suessionum*), Trèves (*A. Treverorum*), Merida (*A. Emerita*), Turin (*A. Taurinorum*). Other towns like London (*Augusta Trinobantum*) have entirely changed their appellation.

Augustine, ST. AURELIUS AUGUSTINUS, the most eminent father of the Latin Church, was the son of a Pagan father, and a Christian mother, Monica. He was born at Tagaste in Numidia in 364 A.D. Though he received a good education, his youth was spent in dissipation, from which his pious mother vainly tried to dissuade him. In 371 he was sent to Carthage, where he is said to have given up his immorality after reading Cicero's *Hortensius*, and to have attached himself to the Manichæan sect. He taught rhetoric there till 383, when he went to Rome and lectured with great success. Settling a few years later in Milan he was converted and baptised by St. Ambrose in 387. Returning to Africa he was ordained by Valerius, Bishop of Hippo, in 391, and became that bishop's coadjutor and ultimate successor in 395. Here he spent the rest of his life in the zealous discharge of his duties, training youths for the priesthood, denying himself for the sake of the poor, and composing the great works which served as a basis for scholastic theology. He wrote much in opposition to the doctrines of the Manichæans, Pelagians, and Donatists. His own views were dogmatically stern, for he denied all future hope to those who did not share through Christ in divine grace. But to his personal opponents, saving the Donatists, he was gentle and courteous. By far the most interesting of his many works are the *Confessions* and *Retractations*. In the first he gives a history of his early life; in the last he manfully reviews his writings and opinions, withdrawing everything that his maturer judgment rejected. His greatest production, *De Civitate Dei*, on which he spent thirteen years, contains an elaborate confutation of Paganism, and an eloquent proclamation of the reign of Christ. Besides these he left commentaries on the Psalms, on St. John's Gospel, treatises on Grace and Free Will, on the Creed, on True Religion, and on various controversial topics, with soliloquies, sermons, and homilies, letters amounting to several hundreds. His style is rugged but powerful, and is marked constantly by touches of simple tenderness and pathos. He seizes on the ethical and dialectical side of questions under discussion, and brings to bear on them

spiritualised common-sense rather than erudition or authority. He died in 430 whilst the Vandals were besieging Hippo, escaping thus the horrors that attended the capture of the city.

Augustine, or AUSTIN, ST., the first Archbishop of Canterbury, was a Benedictine monk of the Convent of St. Andrew at Rome, when Pope Gregory I. in 596 A.D. sent him to convert Britain to Christianity. The gloomy accounts that he received of the island deterred him for a time from undertaking the mission. However, in 597 he landed in Thanet and was well received by Ethelbert, King of Kent, whose wife Bertha, a Frankish princess, was already a Christian. The missioners were allowed to settle in Canterbury, and soon afterwards the king himself was baptised. The new faith now spread rapidly as far as the Humber and the Welsh marches. Augustine is said to have baptised with his own hands 10,000 persons in a day. He was presently consecrated bishop of the English, and in 604 appointed bishops of London and Rochester, Ethelbert founding cathedrals in those two cities as well as in Canterbury. He was unsuccessful in effecting a union between the English and Welsh Churches. His death occurred probably in 607 on May 26, the day dedicated to his memory. He was buried at Canterbury in the Church of St. Peter and St. Paul, afterwards called St. Augustine's Abbey, now the site of the Missionary College, but his remains were translated to the Cathedral in 1091.

Augustinian Canons, an order of monks who observed the rule attributed to St. Augustine of Hippo. They first appear under this name in the eleventh century, and were introduced into England about 1105. They had nearly 200 monasteries in England and Wales. AUGUSTINIAN FRIARS, or AUSTIN FRIARS, who have left their name to a street in the city of London, were organised and put by the Pope under the rule of their alleged founder, St. Augustine of Hippo, in the latter part of the thirteenth century. They were an austere order, holding no property and living only on the alms of the faithful. In 1570 a portion of them adopted a more austere rule forbidding shoes—whence the term "barefooted friars." AUGUSTINIAN NUNS, vowed to the service of the sick, and claiming to have been founded by St. Augustine of Hippo, were till recently nurses at the Hôtel Dieu in Paris.

Augustovo, a town in the Government of Suvalki, Russian Poland. It is on the river Netta, about 150 miles N.E. of Warsaw, and was founded by Sigismund Augustus, King of Poland, in 1560. Linen fabrics are made there, and a considerable trade is carried on in cattle and horses.

Augustulus, or ROMULUS MOMYLLUS AUGUSTUS, the last of the Roman emperors of the West, was the son of Orestes, a general in Gaul, who deposed Julius Nepos, and crowned Augustulus at Ravenna in 475 A.D. Next year Odoacer killed Orestes and dethroned the young prince, allowing him, however, to retire into Campania with a pension of 6,000 pieces of gold. His own subjects in derision added the diminutive suffix to his name.

Augustus, first known as CAIUS OCTAVIUS, and afterwards as CAIUS JULIUS CÆSAR OCTAVIANUS, with the honorary title of Augustus, was the first emperor of Rome. His father was the senator Octavius; his mother, Atia, the niece of Julius Cæsar, who adopted his grand-nephew and left him the greater part of his wealth. At the time of Cæsar's murder the young Octavius was studying in Greece. He returned to Rome and at the age of 20 was made consul in 43 B.C., having first taken up arms against Antony and then been reconciled with him. The two avengers of Cæsar, forming with Lepidus a triumvirate, defeated Brutus and Cassius at Philippi, and then divided the empire between them, Octavius taking the west. In the proscriptions that ensued, the future Augustus, though praised afterwards for his kindliness of heart, seems to have been no more scrupulous than his colleagues. He next had to quell the rising of Sex. Pompeius in Sicily, and whilst this was going on he contrived to force Lepidus into private life. Antony was now his only rival, and at the instigation, it was thought, of Fulvia Octavius began hostilities, but the quarrel was patched up for a time, and on Fulvia's death Antony married Octavia, his colleague's sister. Cleopatra's influence over Antony, however, soon afforded a pretext for renewing strife, and at the Battle of Actium (31 B.C.) Octavius crushed his opponent and stood alone at the head of the Roman world. Three years later he received the title of Augustus. He professed a desire to retire from public life owing to weak health, but Mæcenas and Agrippa dissuaded him. Whatever faults of licentiousness or ambition may have stained his early career, he was certainly an active, painstaking, and wise ruler. He visited most parts of the empire, legislated solely for the public good, and preserved the peace of his vast dominions for nearly half a century. His patronage of art and letters caused great lustre to be reflected on his reign and his private character. It is, indeed, probably true that, when his position was assured, he displayed clemency, affection, and fidelity. The praise of poets and courtiers turned his head in later years, and he assumed divine honours. Though four times married he had but one daughter, Julia, a disgrace to his house. He adopted Tiberius, the son of his wife Livia by her former husband, and on his death (14 A.D.) bequeathed to him the purple.

Augustus I., Elector of Saxony, was born in 1526, and began to reign in 1553. He was fortunate enough to enjoy till his death a period of profound peace, the only discords being those between the Catholics and the Lutherans, between whom he endeavoured to create a *modus vivendi*. He took part in the Diet of Augsburg. His virtues were such as to earn him the appellations of "Pious" and "The Justinian of Saxony." He did much to improve and adorn Dresden, and built the palace of Augustenburg. He died in 1586.

Augustus II. (FREDERICK), Elector of Saxony, and King of Poland, was born in 1670, and succeeded his brother as elector in 1695. He fought on the side of the empire against the French and the Turks, and at the death of John Sobieski in 1697

forced himself into the throne of Poland. Having joined Peter the Great in his opposition to Charles XII. of Sweden, he was defeated by the latter and deposed (1704) in favour of Stanislas Leczinski. He drove out his rival, but was again compelled to resign in 1706. At the fall of Charles XII. he was finally restored, but his kingdom was utterly disorganised nor was he capable of restoring it. Of extraordinary physical strength, he was morally weak. His life was spent in licentious indulgences, and Marshal Saxe was one of his many natural sons. He died in 1733. The porcelain factory and picture gallery at Dresden owe their origin to him.

Augustus III. (FREDERICK), son of the preceding, was born in 1696. On the death of his father he had some difficulty in establishing his claim to the Polish crown, for Stanislas was supported by his son-in-law, Louis XV. It would have been better for that country had he failed, for his incapacity led to the complications by which Russia has profited. He allied himself with Austria against Frederick the Great, and twice his electoral dominions were wrested from him. His daughter, Maria Josepha, married the dauphin and became the mother of Louis XVI., Louis XVIII., and Charles X., who inherited perhaps an element of feebleness from their grandsire. Augustus died in 1763 equally disliked by Poles and Saxons.

Augustus I. (FREDERICK), first King of Saxony, son of the Elector Frederick Christian, succeeded to the electorate as a minor in 1763. He was one of the most enlightened princes of his age, and devoted his best energies to the improvement of his country, especially from the point of view of education, commerce, and judicial reform. After the peace of Posen, 1806, he was recognised as king and received from Napoleon the duchy of Warsaw, in return for which he lent his aid against Prussia and Russia. He afterwards joined the Confederation of the Rhine, but was never looked on very favourably by the Continental powers. In 1815 Warsaw was taken from him and his entire kingdom was in imminent peril. However, the danger was tided over chiefly by the influence of England, and the King of Saxony continued to reign until his death in 1827.

Augustus II. (FREDERICK), nephew of the preceding, was born in 1797 and succeeded in 1836. He had been carefully trained as a soldier and as a statesman, and had for several years acted as commander-in-chief besides taking an active part in framing a liberal constitution. He was successful in tiding over the revolutionary troubles of 1848, and died in 1854, having won the affection of his subjects.

Auk, any bird of the genus Alca, the type of the family Alcidæ, which is confined to the north temperate and arctic regions, and contains the true Auks, the Puffins, and the Guillemots. In the birds of this family the wings are short and pointed, and the feet, which are three-toed and entirely webbed, are set very far back, which renders walking difficult, and gives the birds an ungainly appearance on land. In the water they are exceedingly active, swimming and diving with great rapidity for their food, which consists of fishes and other marine animals. The true Auks constitute the genus Alca, which consists of two species, *A. torda*, the Razorbill (q.v.), and *A. impennis*, the extinct Great Auk.

THE GREAT AUK (*Alca impennis*).

This bird was the largest of the family; it was about 32 inches in length, and stoutly built, the wings were perfectly formed, but so small as to be useless for flight. Its summer plumage was brownish-black above and white beneath, with a large white spot before the eye; in winter there was more white on the head and face. These birds inhabited the temperate region of the North Atlantic, ranging as far south as Massachusetts in the west. They were known to sailors in the seventeenth century as "pinwings" (whence the modern word "penguin"), and were taken in considerable numbers for food. It was the custom to salt them down for future consumption, and the early cod-fishers on the banks of Newfoundland had no inconsiderable share in the extinction of this species. The last specimen known to have occurred in the United Kingdom was shot at Waterford in 1834, and the last individual recorded was taken in Iceland ten years later, and is now in the Royal Museum, Copenhagen. There is a specimen in the British Museum of Natural History, South Kensington. The Great Auk, like most of the family, laid only one egg each year. This was about five inches long, and three inches round at the largest part, and was deposited on the bare rock. The eggs are extremely scarce, and fetch a very high price; in 1887 one was sold by auction for £160. *Mergulus alle*, the Rotche (q.v.), was formerly placed in the genus Alca, and is generally called the Little Auk. In America the term Auk, qualified by an epithet, is often applied to other members of the family, as the Crested Auk (*Simorhynchus cristatellus*), etc.

Auklet, a name for several small species of Alcidæ, chiefly from the North Pacific. [AUK.]

Aulicata, a circle of the province of Syr-Daria, in Russian Turkestan, Central Asia. It occupies chiefly the N. slopes of the Karabura range, and has

an area of 26,530 miles. The port from which it derives its name is on the Talas which flows into Lake Karakul.

Aulic Council (Lat. *aula*, hall, or court), one of the two supreme courts of the Holy Roman Empire, established in 1501 and modified in 1559 and 1654. It was abolished with the Empire in 1806. The term is now applied to the Council of State of the Emperor of Austria.

Aulis, a port in Bœotia, Greece, nearly opposite Chalcis in Eubœa. It was here the fleet assembled before sailing to the siege of Troy, and that Iphigeneia was sacrificed by her father to procure a favourable wind [AGAMEMNON], the event being commemorated in the *Iphigeneia in Aulis* of Euripides.

Auloporidæ, a family of PALÆOZOIC CORALS, the affinities of which are still doubtful; it includes *Aulopora*, *Cladochonus*, and *Monilopora*.

Aulus Gellius, or AGELLIUS, a Latinised Greek, who flourished at Rome as a grammarian and lawyer under Hadrian and his two successors. After a voyage in Greece he wrote his *Noctes Atticæ* (Attic nights), a sort of common-place book, extremely valuable because it contains fragments of lost authors. His style is peculiar, being full of both archaisms and new-fangled expressions, but his judgment is generally sound. Of the twenty books the eighth is unfortunately missing.

Aumale, formerly ALBERMARLE, a small town in the department of Seine Inférieure, France, about 15 miles from Neuchatel, which has given the title of Duke to various families.

Aumale, the COUNT OF and DUKES OF, have frequently played an important part in French history:—

1. CHARLES was one of the heroes of the League, and after the assassination of the Duke of Guise in 1588 was Governor of Paris, which he held successfully against Henry IV., though he lost the battles of Senlis, Arques, and Ivry. He was condemned to be broken on the wheel for high treason in giving up certain towns to the Spaniards. The sentence was carried out on his effigy (1595), and the Duke escaping to Brussels died there in 1631.

2. HENRI EUGENE PHILIPPE LOUIS D'ORLEANS, the fourth son of Louis Philippe, was born at Paris in 1822. He inherited a large fortune from the Condés, and, entering the army at the age of seventeen, distinguished himself during three years' service in Africa (1842–4) by the capture of Abd-el-Kader's *Smalah*. He married in 1844 Marie Caroline de Bourbon, daughter of the Prince of Salerno, but became a widower in 1869. In 1847 he returned to Algeria as governor, resigning his command next year, when his father fled to England. For upwards of twenty years the prince lived chiefly at Claremont or Twickenham. Whilst defending the honour of the Orleanists against the attacks of Prince Napoleon, he felt justified in sending the latter a challenge, which was refused with more discretion than valour. In 1871 he was elected deputy by the constituency of Oise, and, acknowledging the Republic, was restored to military rank and to the enjoyment of his vast estates in France. He presided in 1873 over the trial of Marshal Bazaine, had command of the seventh Army Corps, and behaved with great dignity and patriotism, though he was suspected of gathering about him a party of military supporters. In 1883, after Prince Napoleon's manifesto, an attempt was made to expel all pretenders to the throne by bill. This failed, but M. Jules Ferry soon afterwards deprived the Duke of his command, and in 1886 the Orleanist princes were expatriated. The Duc D'Aumale soon afterwards bestowed his estate and his château at Chantilly upon the French nation. He died in 1897.

Aungerville, RICHARD, better known as RICHARD DE BURY, was born at Bury St. Edmunds in 1281. After studying at Oxford he became a monk of Durham, and was chosen to educate the heir apparent, afterwards Edward III., who made him Bishop of Durham in 1333 and afterwards high chancellor and treasurer. He was a learned man and a great lover of books. He corresponded with Petrarch, and wrote *Philobiblon*, probably the earliest treatise of the kind in England. His library, which he bequeathed to Oxford, was dispersed at the Reformation. He died in 1345.

Aura, a term applied to certain peculiar sensations which precede the occurrence of an epileptic attack and serve as a warning to the patient that a fit is about to take place. The epileptic aura assumes very various forms, among which may be mentioned a sense of pain in some part of the body, a feeling of nausea, or some hallucination of smell, sight, or sound.

Aurelia, one of the commonest of the British jelly-fish. It belongs to the order RHIZOSTOMIDÆ of the ACRASPEDOTE section of Hydrozoa. The adult consists of a rounded disc, convex above and flat below; from the upper part of the disc a tube (the manubrium) is suspended; the mouth is at the lower end, and it opens at the upper end to the "gastric cavity" in the four lobes of which the food is digested. From each lobe a branching canal runs to the margin of the disc, while eight canals run directly to the large canal round the circumference. Four oral tentacles surround the mouth. On the margin of the disc are eight sense organs known as "tentaculocysts" or "rhopalia"; a pair of olfactory pits is associated with each of these. A genital gland occurs in each of the four gastric lobes. The remarkable development found in this genus has been described under ACRASPEDÆ. *Aurelia aurita* is the commonest English species.

Aurelian, or AURELIANUS, LUCIUS DOMITIUS VALERIUS, the son of a peasant at Sirmium in Pannonia, was born about 212 A.D. He possessed great bodily strength and military ability, and serving in the Roman army against the Franks and Goths speedily rose to the rank of consul. In 269 he distinguished himself highly in the great campaign of Claudius II. against the Goths, and was nominated both by the emperor and the legionaries as successor to the throne. He defeated the Gauls

again in Pannonia, and repelled the united forces of the Alemanni, Vandals, Marcomanni, and Jugonthi after a great effort on the Metaurus. His next task was to quell the ambitious Zenobia, Queen of Palmyra. That city was captured and sacked in 273, and Aurelian then turned to the West, where Tetricus had for some years usurped absolute sovereignty over Gaul, Spain, and Britain. Vararanes, the King of Persia, now rebelled, and the emperor was on his way to attack him when he was assassinated by his own officers, whom his severity had long since alienated, at Cœnophrurium in Thrace in 275. Aurelian at first left the Christians undisturbed, but before his death he issued an edict which led to the ninth persecution of the Church.

Aurelius, MARCUS ANTONINUS. [ANTONINUS.]

Aurelius, VICTOR SEXTUS, a Latin historian and official of the fourth century A.D. He was an African of humble birth, but rose to be prefect under Julian of Pannonia II., and consul with Valentinian. About the authorship of two works ascribed to him, viz. *Origo Gentis Romanæ* and *De Viris Illustribus Urbis Romæ*, there is considerable doubt. The latter was probably written by Cornelius Nepos. His most authentic production is *De Cæsaribus*, abridged in *De Vitâ et Moribus Imperatorum*, which covers the period from Augustus to Julian. He was a pagan and evidently opposed to Christianity.

Aureolin, a beautiful and permanent yellow pigment much used by artists. It is delicate and transparent in colour, and consists chemically of a double nitrite of cobalt and potassium, prepared by a process of precipitation. Sometimes known as *Cobalt Yellow*.

Auricle, (1) one of the chambers of the heart. (2) The internal process, of which 10 occur, round the mouth of a toothed Sea Urchin; it serves for the attachment of the muscles and ligaments that work the jaws.

AURICULA (*Primula auricula*).

Auricula, a species of *Primula*, native to the Swiss Alps, with fleshy glaucous leaves and an "eye" or centre to the flower strongly contrasting in colour with the outer rim. Introduced into cultivation three centuries ago, there are now numerous varieties of the species.

Auricular Confession. [CONFESSION.]

Auricularia, the barrel-shaped larva of certain Holothurians (q.v.); it is of interest as it resembles the larva of BALANOGLOSSUS, an animal which is regarded by many as the lowest of the vertebrates.

Auriculidæ, one of the families of LAND MOLLUSCS without an operculum. *Auricula* is the type genus; this commenced in the Chalk period.

Aurillac (Lat. *Aureliacum*), the capital of the department of Cantal, France, on the right bank of the river Jourdanne, which is spanned by a fine bridge. The town grew up in the eighth and ninth centuries round the abbey founded by S. Geraud, to which was attached one of the most famous schools in France. The ruins of this building and of the old castle are in existence, but most of the town is modern. Copper ware, jewellery, woollen goods and blonde lace are made, and there is a large market for cattle and horses.

Aurochs, the German name of the extinct *Bos primigenius* (the Urus of Cæsar), often improperly applied to the European Bison. The error is more than 300 years old, for it was noted in a book published at Antwerp in 1557; since then, however, it has found its way into many zoological textbooks. [BISON, URUS.]

Aurora, in Roman mythology, was the daughter of Hyperion or of Titan and of Thea or of Terra. She was the goddess of dawn and corresponded with the Greek Eōs. By her union with Astræus she became the mother of the winds and the stars, but she deigned also to bestow her favours on Tithonus, Cephalus, and Orion. She was generally represented as drawn in a rosy chariot by four white horses. Her figure was veiled and a star shone on her forehead, a torch in her right hand. With her rosy fingers she opened the *gates of heaven* for the sun, and her tears reached earth in the form of dew.

Aurora Borealis, or NORTHERN LIGHTS, a luminous phenomenon seen in the polar skies. The general appearance is that of a greenish-white arc of light, varying in thickness, symmetrical about the magnetic axis of the earth, so that the highest point of the aurora is in the direction of the magnetic north. Within the arc the sky is of a deeper hue than it is outside. It is never at rest; occasionally ribbons of variegated light shoot out radially from the bow, and produce very beautiful effects. The aurora may remain visible for several hours. Observations seem to show that simultaneous appearances occur at the two poles, north and south. The probable explanation of the phenomenon is that it is an electric discharge through the atmosphere, accompanying a magnetic disturbance. This theory is countenanced by the fact that artificial aurorse working on this principle have been produced by physicists.

Aurungabad, a city in Haiderabad, the kingdom of the Nizam, India. It derives its name from

Aurungzebe, and was founded in 1620, on the site of the village of Gourka, as the capital of the Mogul dominions in S. India. When the Nizams transferred the seat of government to Haiderabad it lost much of its previous importance, and is now half-ruinous. Still its fine bazaars do a large trade in silk, shawls, and native produce. Three or four other places bear the same name.

Aurungzebe, one of the most powerful of the Mogul emperors of Hindostan, was the third son of Shah Jehan, and was born in 1618. His original name was Mohammed but his father altered it to Aurungzebe, which means "Ornament of the Throne." He affected great piety in early life, but in conjunction with his brother Morad rose against Shah Jehan and seized the throne in 1659. He then killed both his brothers, but kept his father in honourable captivity. By his conquests in Thibet, Golconda, Vizapur, and the Mahratta territory he greatly enlarged his dominions, which he administered with wisdom and justice. His children, however, avenged the wrongs done to their grandfather by embittering the emperor's life. Some of them he put to death, and in 1707, when he expired at Aurungabad, he divided the empire between his surviving sons. He was the last of the Moguls who ruled with vigour and firmness.

Auscultation (from a Latin word signifying *to listen*), the art of detecting diseased conditions by the alterations which they produce in certain natural sounds. By means of a stethoscope applied to the chest the physician can discover any deviation from the normal character of the heart sounds, or of the sounds produced in breathing, and thus a most valuable means of detecting the existence of disease is afforded. Thus the presence of fluid in the chest cavity is in some cases productive of a splashing sound if the patient make a slight movement; this fact was known from the very earliest times, and is alluded to by Hippocrates, and this "succussion," as it is called, is thus the most ancient and venerable of all auscultation signs. The development of the science of auscultation is, however, of quite recent date, and was no doubt in part suggested by the method of percussion which was introduced in 1761 by Auenbrugger of Vienna. To Laennec, a French physician, is due the credit of introducing the stethoscope, and formulating the main doctrines of auscultation (1819). He described the altered character of the breathing sounds produced by solidification, or the formation of cavities in the lung, and the "murmurs" or "bruits" which accompany certain diseases of the valves of the heart. The art of auscultation has, however, progressed considerably since his time, and now forms one of the chief subjects of study in medicine, and is one of the most valuable aids to diagnosis which the physician possesses.

Ausgleich, the name given to an agreement between Austria and Hungary, embracing the regulation of their fiscal and commercial affairs, of the amount paid by them to the common expenses of the Empire, and the privileges of the Austro-Hungarian Bank. This agreement was denounced by Hungary in 1896, and long and violent debates ensued as to its renewal.

Ausonius, DECIMUS MAGNUS, the son of a senator at Burdigala (Bordeaux), was born in 3(A.D. Distinguished as a teacher of rhetoric h filled the post of tutor to the Emperor Gratian, an was subsequently made prefect of Latium, Liby and Gaul, and proconsul of Asia. Ten or twel years before his death, which occurred in 395, h retired to a country house near his native town an gave himself up to poetry in the form of epigram epistles, and idylls. He had not much of the divi *afflatus*, but he wrote with some degree of scholar elegance and wit, though he was monotonou affected, and occasionally puerile. His *Parentali Idyl on the Moselle*, and *Crucifixion of Cupid* a the best of his productions.

Auspices (Lat. *avis*, bird; and **spicio*, I look the signs or omens given by the behaviour of bird [AUGUR.] Hence signs or omens generally.

Aussig, AUSSYENAD or LABEM, a town o Bohemia, Austria, in a mountainous region near th confluence of the Bila and the Elbe. The churcl supposed to be of the ninth century, contains Madonna by Carlo Dolci, the gift of the father c Raphael Mengs, who was born here. There are coa mines at no great distance, and the chief industrie are boat-building, woollen and linen weaving, pape and chemicals. Mineral waters, paraffin, fruit, an timber are exported.

Austell, ST., a market town of Cornwall, 1 miles N.N.E. of Truro, on the South Devon Railway It is the centre of the tin-mining district, and larg quantities of porcelain clay are exported to th potteries. It gives its name to a parliamentar division. Pop. (1901), 3,340.

Austen, JANE, the gifted English novelist, wa born in 1775, at Steventon, in Hampshire, he father being rector of the parish. The story of he life is remarkable for its absolute lack of incider or variety. Twenty-six years were passed in th peaceful but dull parsonage at Steventon, with n greater distractions than the movements of somewhat large family, the social gaieties of rather out-of-the-way country place, and an occa sional visit to friends in London or elsewher From her earliest years she had amused herself an her fireside circle at home by writing little sketche thrown off spontaneously and without apparer effort. That her mind at this period was strongl influenced by Miss Burney, Richardson, and Mi Edgeworth can scarcely be doubted, but the or ginality of her own nature soon asserted itsel After completing a story, *Elinor and Marianne*, the form of letters, with *Evelina* before her eyes a model, she recast it entirely in the narrati style, and this work, under the title of *Sense an Sensibility*, appeared as her first published nove *Pride and Prejudice* was composed about the sam time, *i.e.* before her twenty-sixth year, and *Nort anger Abbey*, in which she hits off with mild sati the productions of Mrs. Radcliffe, "Monk" Lewi and the early sensational school, dates from th same period. None of these stories were writte

consciously for the press, and years elapsed before a line of Miss Austen's appeared in print. In 1801 her father migrated to Bath, and this change seems to have checked for a moment the progress of her literary enterprises. Perhaps, too, her ardour was damped by the failure to find a publisher for *Pride and Prejudice* or *Northanger Abbey*. Certain it is that during the four years preceding Mr. Austen's death in 1805 she accomplished nothing more important than an unnamed and unfinished sketch, which never saw the light till 1871, when it was called *The Watsons*. From 1805 to 1809 with her mother and sister she took up her residence in Southampton, but the inspiration never revived during her stay there. At last a home was found in a pleasant cottage on her brother's estate at Chawton, in Hampshire, and her intellectual activity started anew. She had now reached the maturity of womanhood, her powers had developed themselves, her taste become more exacting, and possibly, too, she felt the spur of ambition. During the six years of vigorous life that were left to her she wrought out her three most masterly creations, *Mansfield Park*, *Emma*, and *Persuasion*. In 1811 *Sense and Sensibility* came before the public, to be followed two years later by *Pride and Prejudice*. Her fame was at once established, and so far as the modesty of her character permitted it she enjoyed for a spell the delights of successful authorship, though she died before her reputation reached its zenith. The illness of her brother Henry and other family troubles seriously impaired her health in 1816. She had strength enough to bring *Persuasion* to a close, but not to see it through the press. In July of that year she completely broke down, and after lingering twelve months she died at Winchester in the arms of her devoted sister.

Miss Austen's writings have an indefinable charm which it is difficult to express in words. Her stories have little plot, and nothing stirring in the way of incident or adventure. The range of characters is extremely limited, and she introduces no digressions. Her aim is to show that the ordinary commonplace existence of cultivated people possesses sufficient interest in itself, if it be faithfully and delicately reproduced in language. But to few is given the art to effect this simple process as she effected it. No better description of her style can be given than her own comparison of her works to "a little bit of ivory two inches thick," on which she wrought "with a brush so fine as to produce little effect after much labour." Her life has been written by her nephew, Mr. Austen Leigh, and some of her letters have been edited by her relative, Lord Brabourne.

Austerlitz, a small town in Moravia 12 miles E.S.E. of Brunn. Here on December 2, 1805, Napoleon defeated the Emperors of Russia and Austria in a decisive engagement, sometimes called "The Battle of the Three Emperors," which stripped Austria of 24,000 square miles of territory. The town boasts a handsome palace and park.

Austin, ALFRED, critic, journalist, and poet, was born May 30, 1835. He was educated at Stonyhurst, graduated at the University of London in 1853, and in 1857 was called to the bar, but soon turned to literature for a livelihood. His first work was *Randolph: a Tale of Polish Grief* (1854), an anonymous poem; but his first important one was *The Season* (1861). Among his other works may be mentioned *The Human Tragedy* (1862), *Savonarola* (1881), *Narrative Poems* (1891), *A Tale of True Love* (1902), *Haunts of Peace* (1902), *A Lesson in Harmony* (1904). Edited *National Review*, 1883–93; appointed Poet-Laureate in 1896.

Austin, JOHN (1790–1859), an eminent English jurist. He served for five years in the army, and then was called to the bar in 1818. He soon retired from the active exercise of his profession, and in 1828 entered upon the duties of Professor of Jurisprudence at University College. His lectures at first drew large audiences, but the interest gradually died out, and in 1835 he vacated the chair. He had in the meantime published his great work, *The Province of Jurisprudence Determined*, in which he swept away a mass of confusion that had hitherto obscured legal ideas. He served on the Criminal Law Commission, lectured at the Inner Temple without much success, and in 1836 accompanied George Cornewall Lewis to Malta to assist in an inquiry into the grievances of the native population. After some years abroad, he came home in 1848. His widow published his *Lectures on Jurisprudence* after his death.

Austin, MRS. SARAH TAYLOR, married John Austin in 1820. She inherited the natural talents of the Taylor family of Norwich to which she belonged. Her translations of Ranke's *History of the Popes*, Falk's *Characteristics of Goethe*, and other standard German books won deserved popularity. She died at Weybridge in 1867.

Austin, the capital of Texas, U.S.A., was named after *Stephen Austin*, who by his courage and perseverance succeeded in making Texas a part of the States. It is situated on the left bank of the Colorado river, and at a point where the railways of the State converge. It contains the State Capitol, State University, and many public buildings.

Austin Friars. [AUGUSTINIANS.]

Australasia. The general name of the numerous islands and island-groups lying to the south and south-east of Asia, and to the southward of the tropic of Cancer. In its proper and widest meaning it embraces the continent of Australia, all Oceania or Polynesia, and the Indian Archipelago; and it includes the following, all of which will be found fully dealt with elsewhere under separate headings: Australia, Tasmania, the New Zealand Islands, the Philippine Islands (Luzon, Mindoro, Mindanao, Samar, Leyte, Palawan, etc.), Sumatra, Java, Billiton, Borneo, Celebes, the Sulu Islands, Bali, Lombok, Sumbawa, Sumba, Flores, Timor, the Moluccas, the Tenimber Islands, the Arru Islands, New Guinea, the Marianne or Ladrone Islands, the Caroline Islands, the Admiralty Islands, the Bismarck Archipelago, the Solomon Islands, the New Hebrides, New Caledonia, Norfolk Island, the

Kermadec Islands, the Marshall Archipelago, the Chatham Islands, the Gilbert Islands, the Ellice Islands, the Fiji Islands, the Phœnix Islands, the Tokelan Islands, the Samoan Islands, the Tonga Islands, the Sandwich Islands, Palmyra, Samarang, Fanning, Christmas, Easter, Malden, Manikiki, the Cook Islands, the Society Islands, the Low Archipelago, the Marquesas Islands, Pitcairn Island, and many hundreds of others, the majority of those unnamed being very small. The chief native races are the Malay (in the Indian Archipelago), the Papuan (in New Guinea), the Australian, the New Zealand (allied to the Malayan), the Polynesian, and the Micronesian. A large proportion of the smaller islands are of coral formation, and many of them are atolls, or annular reefs. The aborigines retain but few traces of any ancient civilisation, although in the opinion of some they must at one time have possessed considerable cultivation. In several of the islands, and notably in the Carolines and at Easter Island, prehistoric colossal statues and ruins of gigantic works of hewn stone abound. Most of the native Australasians were, at the time of their discovery, cannibals, and many are cannibals still. Very few of them had any distinct religious system; but nearly all the minor groups were governed directly or indirectly by a semi-religious caste, which maintained its influence by means of the institution called *tabu*, viz. the ceremonial setting aside or consecration of people, places, and things for particular purposes. Violations of *tabu*, always very rare on account of the supernatural penalties which were supposed to follow its infraction, were, when they occurred, usually punished with death. Christianity has made great progress throughout Australasia, and to-day most of the natives are, at least nominally, either Roman Catholics or members of Protestant Nonconformist sects.

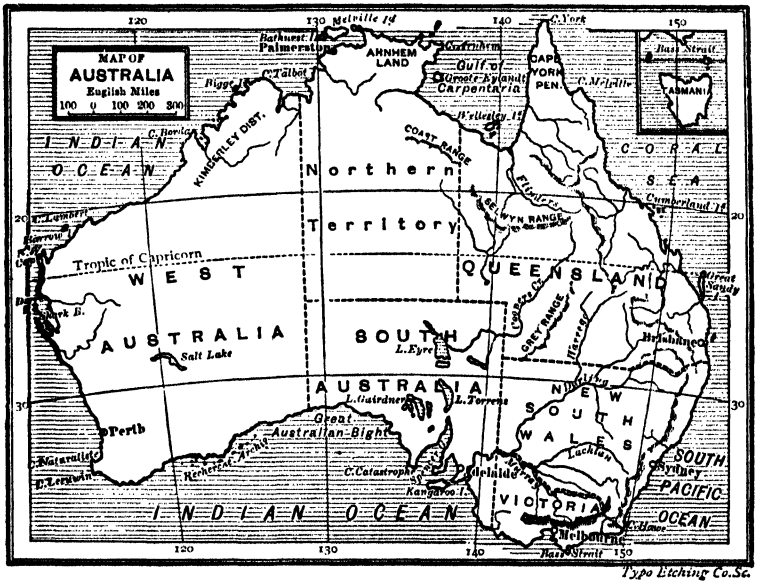
Australia. *Extent, Configuration, Islands.*—Australia, the smallest of the continents and the largest of the islands of the world, has an area of 2,974,581 miles, and is, therefore, of about the same size as the United States of North America, if the vast lake surface of the latter be left out of the computation. The population of Australia in 1901 did not, however, exceed 3,773,801 exclusive of the aborigines, who are rapidly dying out, and who do not now, in all probability, number more than fifty thousand souls. The general outline of the island is that of an irregular half-moon, with the concave side, formed by the Great Australian Bight, facing to the south. The distance between the extreme north at Cape York (lat. 10° 40′ S.) to the extreme south at Wilson Point (lat. 39° 10′ S.) is about 1,930 miles; and between the extreme east at Cape Byron (long. 153° 35′ E.) to the extreme west at Steep Point (long. 113° 15′ E.) about 2,450 miles. The coast is not very irregular or deeply indented, except on the north, and the estimated length of coast-line does not exceed 10,000 miles. The islands—if Tasmania, which lies to the south, and is separated from the continent by Bass Strait, 130 miles wide, be excluded—are neither numerous nor important. On the east they include Prince of Wales Island, Albany Island, the Cumberland Islands, the Northumberland Islands, Great Sandy Island, and Moreton Island; on the south, King Island, Kangaroo Island, Nuyt's Archipelago, Recherché Archipelago, and Eclipse Island; on the west, Peel Island, Rottnest Island, the Abrolhos or Houtman Rocks, Dirk Hartog Island, Barrow Island, Dampier Archipelago, and Expedition Island; and on the north, Bathurst Island, Melville Island, Goulburn Island, Wessel Island, Groote Eylandt, the Sir Edward Pellew Islands, and the Wellesley Islands. The chief bays are the Great Australian Bight, with its deepest inlet, Spencer Gulf, on the south; King's Sound, Collier Bay, and Cambridge Gulf on the west; and the Gulf of Carpentaria on the north. Along the northern part of the east coast, and at a distance from it of from fifty to two hundred miles, runs the Great Barrier Reef, which forms a coral breakwater over 1,200 miles long, with a deep and well-sheltered, though somewhat intricate, channel between it and the shore. The most important peninsulas are those of Cape York and Arnhem Land, on the north, and Eyria and York, on the south.

Physical Features.—Australia, although much of it may be described as hilly, is, as regards great summits, the least mountainous, as it is also the least well-watered, of the continents. The elevated tracts lie chiefly in the eastern half, much of the interior of the western half being a sandy and almost waterless plain, known in its northern part as the Great Sandy Desert, and in its southern as the Great Victoria Desert. Most of the coast, nevertheless, is hilly, the hills being generally topped by plateaux. The chief ranges or groups are the South Australian Highlands, in Victoria and New South Wales, including the Interior Ranges (Mount Arrowsmith and Mount Lyell, 2,000 ft.), the Great Dividing Chain, the Muniong Range (Mount Kosciusko, 7,308 ft.), the Australian Alps (Bogong, 6,500 ft., Hotham, 6,100 ft., The Twins, 5,575 ft.), the Grampians, the Pyrenees (Mount William, 5,600 ft.), and the Blue Mountains; the mountains of South Australia, including the Lofty Range (2,334 ft.) and the Flinders Range (3,000 ft.); the Coast Range of Queensland (5,000 ft.); and the mountains in the north-west of Western Australia (Mount Labouchere, 3,400 ft., Mount Bruce, 3,800 ft.). In the south-eastern part of South Australia, near the Victorian frontier, are several extinct volcanoes.

Geology.—Australia, which geologically shows signs of vast antiquity, is, over great part of its area, extraordinarily rich in the valuable and useful minerals, in asbestos and the porphyries, in coal, and in precious stones. Gold is found largely in nearly all parts of New South Wales, over at least one half of Victoria, in Queensland almost everywhere, and to some extent in the other colonies. Valuable veins of silver exist on the confines of New South Wales and South Australia. Enormous quantities of tin are found in New South Wales (where the stanniferous area is estimated at 5½ million acres), in the beds of the tributaries of the Yarra-Yarra in Victoria, and elsewhere. Copper occurs most plentifully in South Australia, in metamorphic and palæozoic rocks, and in Queensland,

where a peculiarly fine malachite abounds. Antimony, in the form of oxide, sulphuret, and sulphide, generally enclosed in quartz, abounds in New South Wales and Victoria. Iron, chiefly in the form of hæmatite, is also worked in the same colonies. Coal of all kinds, including kerosene shale, which yields upwards of 150 gallons of crude oil per ton, is found over a wide area of New South Wales, and in Queensland. Opal is freely met with in Queensland, in trachytic conglomerate and sandstone. Fine diamonds have been found in all the colonies except South Australia and Western

central southern section is mainly drained by such more or less intermittent streams as the Diamantina, Alberga, and Cooper, into the large land-locked evaporating basins of South Australia. Most notable of these are Lakes Torrens, Eyre, Gairdner, Frome, Gregory, and Blanche. The south-western section of the continent has no rivers of importance, and the Swan river is the only stream which is really navigable. The north-western section is a little better off; but most of the rivers there are sometimes dry. The chief are the Ashburton, the De Grey, and the Fitzroy. The northern section



MAP OF AUSTRALIA, SHOWING THE POLITICAL DIVISIONS.

Australia. New South Wales also possesses galena, sulphuret of mercury, bismuth, and zinc, with rubies and sapphires; Victoria—osmium, zinc, cobalt, manganese, kaolin, gypsum, bitumen, and molybdenite; South Australia—bismuth and bitumen; Queensland—cobalt, nickel, cinnabar, zinc, sardonyx, agates, sapphires, garnets, topazes, porphyries, slate, and basalt; and Western Australia, zinc. There are many fine marbles and building-stones.

Hydrography.—Much of Australia is very indifferently watered, and the whole continent is singularly lacking in navigable rivers of any considerable size. The chief river, the Murray, is one of the few exceptions. Rising in the Muniong Range, it receives on its right bank the waters of the Murrumbidgee and Darling, has a length of about 1,300 miles, and drains nearly 270,000 square miles of territory, or about three-quarters of New South Wales and Victoria. It is the principal drainer of the south-eastern portion of the continent. The

contains the more permanent rivers, Roper, Adelaide, and Victoria, the first of which is navigable for a distance of over 100 miles. The north-eastern section is drained chiefly into the Gulf of Carpentaria, whither flow the Mitchell, Staaten, Gilbert, Norman, Flinders, Leichhardt, Albert, and other rivers; but, to some extent also, into the Pacific, into which the Brisbane and several smaller streams empty themselves. Speaking generally, the eastern third of the continent drains either southward or northward into the sea; the central half drains into lakes, or gets rid of most of its moisture by evaporation; and the western sixth drains westward into the Indian Ocean. Many minor rivers, which would otherwise be navigable for a short distance inland, have their mouths choked by sandbanks.

Climate.—About two-fifths of the Australian continent lie within the tropics. The remainder, including the whole of Victoria and New South Wales, enjoys one of the most pleasant and salubrious

climates in the world—a climate which bears a general resemblance to that of South Italy, though, owing to the greater extent of the territory, the mean temperature is more varied. In New South Wales the mean heat in summer is about 80° F., but near the coast this is agreeably tempered by the sea-breeze, which usually blows all day, a land-breeze following at night. On the inland plains, however, the mercury in summer often rises as high as 130° in the shade, and mounts almost daily to 100° during that season. In winter, nearly everywhere south of Sydney there is occasional hoar-frost and snow. In the hills snow is common; and there are places, such as Kiandra, where the mean annual temperature falls as low as 46°, and where the thermometer sometimes falls to 5°. The air is exceptionally dry and pure; perhaps owing to the depression and aridity of large tracts in the interior, perhaps to the influence of the trade winds. The annual rainfall is very unequally distributed. At Sydney it is about 80 inches; at Melbourne, 40 inches; at Adelaide, 21 inches; at Perth, 31 inches; on some of the interior plains, almost *nil;* and in parts of the hilly districts, enormous. Nearly all the lowlands are liable to long-continued droughts at uncertain periods. The streams then disappear in the parched earth; the herbage turns brown; and the cattle die of thirst, or of exhaustion consequent upon their unavailing efforts to struggle through the mud to the waters of some fast-vanishing pool. With these droughts come the terrible hot winds, which feel like a blast from a furnace. Happily, the hot winds are rare, occurring only in summer, and then lasting not more than two or three days; but while they last life is almost unbearable. They lull, however, at night. On the interior plains a fire is the almost invariable accompaniment of the hot wind. Often this fire reaches phenomenal proportions. One, in 1851, devastated half the settled portion of what is now the colony of Victoria, caused immense loss of life and stock, and even threatened Melbourne. On February 6th, the day of this fire, the thermometer stood at about 119°, but fell rapidly at night to 80°. In the northern parts of the island there are, as in most tropical climates, regular wet and dry seasons. The Government Observatory at Sydney prepares elaborate meteorological statistics relating to the entire continent, and receives daily reports from stations in all districts and in New Zealand and Tasmania. It also publishes a daily weather-chart of Australasia, as the British Meteorological Office does of Europe.

Flora.—The natural flora of Australia is strangely suited to the peculiarities of the climate. The great plains are largely covered with grasses, the roots of which have the power of lying dormant during protracted droughts, and of reviving in response to the first shower or heavy dew. Where the droughts are less frequent there is magnificent forest vegetation. Among the most notable trees and shrubs which are indigenous are many myrtaceæ, including the *Eucalyptus globulus*, or blue-gum; the *Xanthorrhœa*, or grass-tree; the tea-tree, the yellow-wood, the ironwood, certain cedars, the sago-palm, the cabbage palm, many mimosas and other leguminosæ, and numerous orchideæ, figs, bananas, yams, etc.; but in one part or another of the vast island almost everything will thrive, and the whole flora of tropical and temperate lands has been successfully introduced.

Fauna.—The fauna of Australia differs in nearly every respect from that of any other region on the world's surface. Monkeys, Carnivora, and Ungulates are replaced by Marsupials and Monotremes; the rodents are modified forms of rats and mice; the bats alone possess no special interest, as they are forms common to the whole Eastern hemisphere. There are many characteristic birds, of which the chief are the Lyre-birds, the Scrub-birds, various parakeets, the Mound-birds, the Cassowaries, the Frog Mouths, the Black Swan, etc. There are many poisonous snakes, and thirty-six genera of lizards are peculiar to Australia. There are three peculiar genera of fresh-water turtles, but no tailed Amphibia, though frogs and toads are numerous. The most remarkable fish is Ceratodus (q.v.). Australia is poor in butterflies; richer in beetles, the longicorus abounding throughout the region.

Population.—The aboriginal population is a very low and dark-coloured branch of the Melanesian stock—of cannibal proclivities, and of the most debased habits. The people are, however, very rapidly dying out, and are not now supposed to number more than 50,000 souls, of whom about 10,000 are in Queensland. The non-aboriginal population is principally of British ancestry or birth (about 91 per cent.), of German ancestry or birth, and of Chinese birth. The number of Chinese on the continent is estimated at 22,000.

Geographical Exploration and Progress.—The mainland of Australia, though it was seen by De Gonnerville, a French navigator, as early as 1503, seems to have been first touched at in 1606 by the Dutch yacht *Duyfhen*, which, returning from an exploring expedition along the coast of New Guinea, made the land somewhere near the mouth of Batavia river on the east shore of the Gulf of Carpentaria. Godinho de Eredia had sighted Cape Van Diemen, on Melville Island, in 1601, and parts of the coast of the new continent, then known as New Holland, were traced by English, Dutch, Portuguese and Spanish navigators in 1605. In 1606, also, De Torres passed through the strait which now bears his name, and sighted Cape York. These discoveries were followed up in 1616 by the Dutch navigator Dirk Hartog, in the ship *Endraaght*. He visited the west coast, and left an inscribed plate on what is now Dirk Hartog Island, near the mouth of Shark's Bay, Western Australia. In 1618 Zeachen, another Hollander, discovered Arnhem Land on the north, and, as some say, part of Van Diemen's Land on the south of the continent. The discovery of the Great Barrier Reef, by Harris, followed in 1619; and of long stretches of the north coast by the Dutch vessels *Leeuwin* and *Arnhem*, in 1622 and 1623. In 1627 Pieter Nuyts followed the south coast for a thousand miles; in the next year the Dutch ship *Vianen* was off what is now Port Essington; and in 1629 Pelsart, in the ship *Batavia*, was wrecked on the west coast. Abel Janszoon Tasman, commissioned by A. van Diemen, governor of Batavia, to explore the extent southwards of the

new land, sailed from Batavia on August 14, 1642, in the yacht *Heemskirk*, with the tender *Zeedhen*, and discovered Tasmania, which he named Van Diemen's Land, as well as New Zealand, which he named Staten Land. Thenceforward exploration languished for more than half a century, but in 1663 Thevenot published his chart of the west coast of "Hollandia Nova," and in 1688 Dampier fell in with the northern part of the continent; while in 1696 Willem de Vlaming visited the north and south-west coasts, and sailed a distance of 18 leagues up the Swan river. Exploration was resumed with vigour by Dampier in the *Roebuck* in 1699; by the Dutch in 1705, when much of the north coast was charted; and by Roggewein, with a Dutch squadron, in 1721–22. Captain Cook, with the *Discovery* and *Resolution*, examined much of the east coast in the course of his voyages; and in 1786 it was determined by Parliament to establish a penal settlement at Botany Bay, whither, in the following year, the first convict fleet of six transports, two men-of-war (the *Sirius*, 20, and *Supply*, 8), and three storeships sailed under the command of the first governor, Commodore Arthur Phillip, R.N., with Captain John Hunter, R.N., as his captain. The squadron arrived on January 18th, 1788; a few days later two French vessels, the *Boussole* and *Astrolabe*, under La Perouse, also arrived. The coasts were further explored by these expeditions, and by that of Bass and Flinders, who named the continent "Australia," in 1798–99. The last year of the eighteenth century witnessed Grant's survey of all the coast, from Bass Land to Cape Northumberland. From that time forward the exploration of the interior began. In 1810 there were 10,454 Europeans in Australia, one-fifth of them being convicts and 1,100 soldiers. Three years later the first successful attempt was made to cross the Blue Mountains. They had until then been considered impassable, not so much by reason of their height, which is inconsiderable, as by reason of the steepness of their summits, which seem not to have been traversed even by the natives. In 1817 Oxley traced the Lachlan river, and in 1818 the Macquarie river, and constructed the first map of Australia. In 1821 the first stage-coach was running, and the population stood at 29,783. In 1824 Messrs. Howell and Hume made many new interior discoveries; by 1826 three newspapers were being published in the colony; and in 1829 Sturt began his first exploring expedition on the west. In the next year he began his second, and in 1831 Mitchell discovered the Peel and Darling rivers. Up to about this time the settled part of the colony was, with the exception of the small settlement on the west, under a single government, the successive governors being Phillip, 1788–92; Grose, Paterson (as *locum tenentes*), Hunter, 1795–1800; King, 1800–06; Bligh, 1806–08; Macquarie, 1810–21; Brisbane, 1821–25; Darling, 1825–31; Bourke, 1831–37; and Gipps, 1838–46; but in 1833, by Act of Parliament, the continent was divided into West and South Australia; and South Australia was actually proclaimed a separate colony on December 28, 1836. The erection of other separate colonies followed, as is shown below. In the meantime, exploration was continued by Mitchell in 1835; by Hesse and Gellibrand, who perished, and by Mitchell again, in 1836; by Earle, Eyre, Strelecki, and Ross in 1841; and by Landor and Lefray in 1843. Leichardt's trans-continental expedition left Sydney in October, 1844, and reached the shores of the Gulf of Carpentaria in November, 1845. Other important inland expeditions have been those of Stuart, 1860–61; Burke, 1860; Howett, 1861; Walker, 1861; M'Kinlay, 1862; Macintyre, 1864–66; Giles, 1872; Forrest, 1869–75; and Warburton. Much of the west central portion is still, however, unknown.

Political Divisions.—The whole Continent forms part of the British Empire, and so much of it as was settled formed, until 1829, a single colony. The colonies, and dates of their separate establishment, are now—New South Wales (the original colony); Western Australia, 1829; South Australia, 1836; Victoria, 1851; Queensland, 1859. Each is treated under its proper head. In 1899 they (together with Tasmania) agreed to establish a Federal constitution, and in 1900 the Commonwealth of Australia was established. In 1901 the Territory of Papua (British New Guinea) was taken over by the Federal Government. [FEDERATION.]

The *aborigines* of Australia form a tolerably homogeneous division of mankind, whose nearest affinities are with the Melanesian or Dark peoples of the Oceanic world. But they are distinguished from all other Negro or Negroid races especially by the combination of a black or nearly black complexion with wavy hair, never woolly, and a full beard. Some writers distinguish two types, and within given limits certain differences are observed, some being tall, stout, and vigorous, others of low stature, feeble, and debased. But these differences may be sufficiently explained by the more or less favourable environment of the several groups, some occupying the productive region of the Murray-Darling basin, others roaming over the steppe lands near the desert. The substantial unity of the race seems to be further established by a community of traditions, social usages, weapons, and implements, and especially by their common speech, all the Australian idioms possessing the same phonetic and structural systems and being apparently derived from one original stock language. Their mental capacity also stands everywhere at about the same level, as shown, for instance, by the fact that scarcely any have radical

ABORIGINAL FROM QUEENSLAND.

terms for the numerals above *two;* thus, *three* is 2 + 1; *four* 2 + 2, and so on, from one end of the continent to the other. The low state of culture indicated by this fact is shown also by the barbarous rites practised on the youths at the age of puberty; by the prevalence of infanticide and in many places of cannibalism; by the wretched character of the dwellings, often little more than screens of foliage set up to windward; by their omnivorous diet, ranging from grubs and vermin to snakes and human flesh; lastly by their peculiar marriage customs (MARRIAGE) and their treatment of the women, who are the merest drudges with no rights or privileges, and condemned to spend their lives in ministering to the wants of their masters. The most prevalent weapons are spears, clubs, and darts with bone or flint heads; the characteristic boomerang, or returning throwing-stick, is limited to certain districts, and not used in warfare. Tattooing of a rude description, consisting of a few scarifications or incisions artificially raised to permanent welts, is generally practised, and supplemented by painting the body with white, black, red, or yellow ochre, according to the various funeral, festive, or warlike occasions. There is no political organisation of any kind, nor are there any so-called "kings" or even hereditary chiefs, as is commonly asserted. The tribe regulates its affairs by a council of elders, each head of a family retaining almost absolute control over the domestic group. The natives appear to believe in the immortality of the soul, but not in a presiding deity. The universe is full of spirits, some good or benevolent, some harmless and even feeble, others malevolent, to be conjured or thwarted by the charms and spells of the wizard or medicine man. The most comprehensive works on the Australian race are J. R. Brough Smyth's *Aborigines of Victoria*, London, 1878, and E. M. Curr's *Australian Race*, Melbourne, 1887.

ABORIGINAL WOMAN FROM QUEENSLAND.

Australian region, one of the six prime divisions into which the surface of the earth is divided by zoologists. It contains four sub-regions: (1) the Austro-malayan, including the islands from Celebes and Lombock on the west, to the Solomon Islands on the east; (2) the Australian, consisting of Australia and Tasmania; (3) the Polynesian, including all the tropical islands of the Pacific; and (4) the New Zealand sub-region, consisting of New Zealand, with Auckland, Chatham, and Norfolk Islands.

Austria. Originally given to a small district on the south bank of the Danube, this name now includes all the lands which have been at various times annexed to the Austrian crown. These are: Lower Austria, Upper Austria, Salzburg, Styria, Carinthia, Carniola, the coast districts (Goerz-Gradisca, Istria, and Trieste), Tyrol and Vorarlberg, Bohemia, Moravia, Silesia, Galicia, Bukowina, and Dalmatia. The term is frequently, though incorrectly, used in a still more extended sense to indicate all the dominions of the Emperor Francis Joseph I. These include, in addition, Bosnia and Herzegovina, and the kingdom of Hungary, made up of the "crown-lands" of Hungary, Transylvania, (Siebenbürgen), Fiume, Croatia, and Slavonia.

Austria and Hungary are separated by the river Leitha, whence they are often called Cis-Leithania and Trans-Leithania respectively, and are so intimately connected, geographically and politically, that it will be found more convenient to consider them together. The present article therefore treats of the Austro-Hungarian monarchy, the ruler of which is officially styled "Emperor of Austria, King of Bohemia, etc., and Apostolic King of Hungary."

The monarchy is, with the exception of Russia, the largest of the European states. It extends from long. 9° to long. 26° E., and from lat. 42° to lat. 51° N., comprising an area of 240,942 English square miles. These figures do not include the territories of Bosnia and Herzegovina, with an area of 20,000 sq. m., which, though nominally still provinces of the Ottoman Empire, have since 1878 been governed and administered entirely by Austria.

Mountains.—Next to Switzerland, Austria is by far the most mountainous land in Europe, no less than four-fifths of its area being more than 6,000 feet above the sea-level. The chief ranges are (1) the Alps, in the south-western region, distinguished as the Rhætian, Noric, Carnic, Julian, and Dinaric Alps, the highest peak being the Ortler Spitze, 12,814 feet, in the first-named division; (2) the Carpathians in the E. and N.E., culminating in the Eisthaler Thurm, 8,378 feet, and (3) the Hercynian system, in Bohemia, Silesia, and Moravia, including the Erzgebirge and the Riesengebirge with its crowning peak, the Schneekoppe, 5,330 feet.

Rivers.—Owing to the conformation of the great watersheds formed by the ranges above described, the rivers flow in three directions, north, south, and east. The most important is the Danube, which, entering the empire at its confluence with the Inn, by Passau, on the Bavarian frontier, traverses it for a distance of 820 miles (rather less than half of its total length), quitting Austrian territory at the Iron Gate, a gorge formed by the near approach of the Eastern Carpathians and a branch of the Balkan range, on the confines of Bulgaria and Wallachia. During this part of its course the Danube falls 766 feet. The largest of its many tributaries is the Theiss, which drains the eastern plains of Lower Hungary, rising on the borders of Galicia, and

flowing into the Danube below Peterwardein; it is navigable throughout nearly the whole 500 miles of its length. It is worthy of note, as illustrating the inland situation of the empire, that not one river of any importance debouches into the sea in Austrian territory.

Lakes.—The largest is the Platten See, or Lake Balaton (the ancient *Volcea Palus*), in south-west Hungary, 48 miles in length; it is very shallow, and slightly salt. The Neusiedler See, about 30 miles S.E. of Vienna, within the Hungarian border, is remarkable for the changes in its level, which sometimes varies to the extent of five or six feet. In Lake Zirknitz, in the mountains of Illyria, there is a total disappearance of the waters in summer, so that the bottom is brought under cultivation and produces a harvest of clover and rice.

Coast-line.—This is limited to the eastern shore of the Adriatic—Austria's only sea — from the Gulf of Trieste to Cattaro in Dalmatia. The coast constitutes about one-fifth of the total frontier line.

The *climate* differs considerably in the different States, but is generally good and healthy, except in the swampy districts of Lower Hungary.

Minerals abound in both Austria and Hungary; in the amount of the precious metals no other European country can compare with them. There are gold mines now yielding a fair amount of ore, which were worked by the Romans of old. Iron, copper, lead, salt, and coal are widely diffused. The richest quicksilver mine in Europe, after that of Almaden in Spain, is at Idria in Carniola. An exceptionally good quality of iron, obtained in Styria, Carinthia, and Carniola, goes by the name of "native steel."

Flora.—The variations in the climate produce an extended range in the vegetable world, from the olive and palm on the mild Adriatic coast to flax and other northern plants in Galicia and Bohemia, besides the distinct flora of the Alpine regions. The number of plants is estimated at 12,000, about one-third of which are flowering species. Of these nearly one-half are found in Lower Austria, which alone produces some 1,700 flowering plants. A leading characteristic of the country is the abundance of *forests*, which extend over about a third of its surface. Some of the finest oak and other timber trees in Europe are to be found in the mountain regions of Transylvania.

Fauna.—The large proportion of Alpine and forest land makes Austria an exceptionally interesting country to the sportsman and the naturalist, several wild animals being still frequently met with, which have long disappeared from more highly cultivated regions. Among others may be noted the brown bear, lynx, wolf, jackal, deer, chamois (now very scarce), and wild boar. The golden eagle and others of the falconidæ, with two or three kinds of vulture, inhabit the wild mountainous districts, and the Hungarian marshes abound in waterfowl of numerous species; the white heron or egret is so plentiful that its feathers are an article of export. The great bustard is still found in the plains of Hungary. The Theiss is said to be more plentifully stocked with fish than any other European river, the lakes also have an abundant supply, some of the species being elsewhere unknown.

Population.—The official estimates of the population are:—Austria, 26,712,154 (1903); Hungary, 19,254,559 (1902); and a total of 48,141,961 (1902), or 46,550,925 excluding Bosnia and Herzegovina. The various races which contribute to this total may be roughly classified as follows: (1) Slavs (about 19 millions), including Czechs and Moravians in the north, Slovacks in the Western Carpathians, Poles and Ruthens in Galicia, Slovens, Croatians, and Serbs in the south; (2) Germans (10 millions), mostly in Bohemia, Upper and Lower Austria; (3) Magyars (6½ millions) in Hungary; (4) Roumanians (2½ millions) in the Bukowina and parts of Transylvania and Hungary. The rest of the population is made up of Italians, Jews, Armenians, Greeks, Albanians, Gipsies, etc.

History.—Passing over the classical period, during which the struggles of the Pannonians, Dacians, and other inhabitants of the basin of the Danube against the Roman arms were not such as to distinguish them from other "barbarians," we come at once to the period of Charlemagne. The great Kaiser, towards the end of the eighth century, founded the margravate of Austria (called Oesterreich, or Eastern Kingdom, from its position with reference to Charlemagne's other dominions), in the country S. of the Danube and E. of the river Enns. In the year 1156 the Emperor Frederick I. added the country W. of the Enns, and raised Austria to the rank of a duchy. In 1278 the Emperor Rudolf I. took possession of the duchy. Four years later he gave it to his son, Albrecht I. of Hapsburg, and thus became the founder of the dynasty which has ever since swayed the destinies of Austria. After many changes and transfers, often of a violent nature, to various branches of the Hapsburg dynasty, Austria in 1453 was made an Archduchy. Ferdinand I., brother and successor to the Emperor Charles V., married a daughter of the King of Hungary and Bohemia, by which union those countries were first brought under Austrian rule.

Hungary had been a separate kingdom for 500 years before this, its first king, Stephen I., having been crowned A.D. 1000. Hungarian history for centuries after his accession is one long record of struggles against the Turks. Indeed it is mainly owing to the resistance of the brave Magyars, who were unsurpassed as light cavalry, that the oriental despotism of the Ottoman Empire was confined to the south-eastern corner of Europe. These Magyars, from whom the Hungarian of to-day is proud to claim descent, are known to be a kindred race with the Turks and Fins. Their name and language, with many features of their character, still survive. The most distinguished of the Hungarian kings was Matthias Corvinus, who gained a high reputation for valour, justice and learning. He founded the University of Pressburg in 1467, and died in 1490.

On the death of the Emperor Karl VI. in 1740 the male line of the Hapsburgs came to an end, but his daughter, Maria Theresa, succeeded him, by virtue of the Pragmatic Sanction. The war which ensued, commonly called "the War of the Austrian Succession," ended in the triumph of

Maria Theresa over most of the European sovereigns, including Frederick the Great. Maria Theresa married Duke Francis of Lorraine and Tuscany, her descendants being consequently named the Hapsburg-Lothringen (Lorraine) line. She died in 1780, and was followed on the throne by her two sons, Joseph II. (died 1790) and Leopold II. (died 1792). When the Holy Roman Empire was extinguished by Napoleon in 1804 Leopold's son, Franz I., assumed the title of Emperor (Kaiser) of Austria. He died in 1835. His son, Ferdinand I., abdicated in 1848, when his nephew, the present Emperor Franz Josef I., succeeded to the united thrones. The crown of Hungary, it may be observed, is conferred by a separate ceremony at the Hungarian capital.

The chief event of the present reign was the war with Prussia in 1866, which was occasioned by difficulties arising out of the joint administration of the provinces of Schleswig and Holstein, taken from Denmark in 1864. The war terminated in the defeat of Austria at Königgrätz, and the formation of the North German Confederation, and Austria ceased to be reckoned as a German power. In 1898 the Empress was assassinated. In 1905 a severance of the two countries seemed imminent. In 1908 Bosnia and Herzegovina were annexed, which led to strained relations between Servia and Austria in 1909.

Constitution and Government.—Although united under the sway of one monarch, the Empire of Austria and the Kingdom of Hungary are not by any means amalgamated. At the date of the union (1724) Austria was an absolute, Hungary a limited monarchy. No attempt to combine the two countries under an identical system has been found successful, but after many political vicissitudes the government is now, by virtue of a law of 1867, established in a form which may be described as constitutionalism on a dual basis. [AUSGLEICH.]

The Austrian parliament, or *Reichsrath*, consists of two chambers. The Upper House (Herrenhaus) is composed of princes of the imperial house, heads of noble families, the archbishops, certain bishops, and a number of men distinguished in church, state, science, or art, nominated for life by the emperor. The Lower House (Abgeordnetenhaus) contains 516 members, elected by universal suffrage, male citizens over 24 years of age with a year's residence in the place of election being entitled to vote.

The Hungarian parliament, or *Reichstag*, has also two houses, the upper (Förendiház) composed of the higher clergy and nobility, and the lower (Képviselöház) of 453 members elected by male citizens over 20 years of age who pay a direct tax.

The two parliaments elect annually a body of 120 members, 20 from each upper and 40 from each lower house, which is known as the Delegations, and meets alternately at Vienna and Pesth to discuss affairs relating to the whole monarchy.

The legislative power is vested in the sovereign and the two houses in each country, the executive in the sovereign alone.

Each of the Austrian crown-lands has a *Landtag* for the management of local affairs, but in Hungary only Croatia and Slavonia (together) have such a body. The number of members varies according to locality, from 20 in Vorarlberg to 240 in Bohemia.

The Ministers of Foreign Affairs, War, and Imperial Finance act for the whole monarchy, under the presidency of the first-named. Austria has the following 9 Ministries:—Interior, Finance, Commerce, Agriculture, National Defence, Justice, Instruction, Railways, and Labour, besides 2 Ministers without portfolios, and a separate Minister for Galicia. Hungary has the first eight as in Austria, with a separate Minister for Croatia and Slavonia, and a "Minister *a latere*." The last of these is established at Vienna, and forms a connecting link between the sovereign and the Hungarian Government. All the others are at Buda-Pesth, the Hungarian capital.

Religion.—Perfect liberty of faith and conscience is allowed. Every recognised religious body enjoys freedom of worship and management of its affairs. The "recognised" bodies are the Roman Catholic, Greek-Oriental, Evangelical (Lutheran and Reformed), Gregorian-Armenian, and Jewish churches throughout the monarchy, together with the old Catholics and the Evangelical Brotherhood in Austria, and the Unitarians in Hungary. The Roman Catholics constitute about 80 per cent. of the population in Austria, and about 50 per cent. in Hungary. All the churches are alike independent of the state.

Education.—(1) Elementary schools. The erection of these is incumbent on the several school districts. Attendance is compulsory between the ages of 6 and 14 (with slight variations in some states). There are two grades in Austria, and three in Hungary. "Religion and Morals" forms one of the obligatory subjects in all. In 1900 the attendance in Austria was 89·4 per cent. In Hungary, in 1900, it was 80·3. School-fees vary considerably in different localities, but are generally very low. In Hungary they average 12 per cent. of the total cost of education. (2) *Gymnasia* and *realschulen*. These are preparatory for the universities and technical schools; the curriculum extends over 7 or 8 years. They are mostly maintained by the state, or enjoy a subvention from it. (3) Universities and colleges. There are in all 11 universities, 8 in Austria and 3 in Hungary. The oldest is at Pressburg (once the Hungarian capital), founded in 1467, and the largest is at Vienna, with over 7,000 students. There are four faculties, viz. theology, law, medicine, and philosophy. Of theological colleges, Austria has 48 and Hungary 49; the latter country also possesses 10 schools of law. There are seven government technical high schools of engineering and chemistry, and nearly 2,000 technical institutes for teaching agriculture, forestry, mining, and other industries, art, music, etc.

It is to be noted that there are no establishments for the education of boys of the upper classes on a par with our public schools; the majority of such boys are educated at home, and examined periodically at the gymnasium to test their progress.

Industries.—Agriculture has never attained the importance which the natural opportunities appear to indicate. Only 6·2 per cent. of the entire

Austro-Hungarian area is unproductive. The Hungarian plains consist of soil equal to any in Europe in fertility, and might long since have placed the country in the foremost rank among the corn-lands of the world. Excessive duties, imperfect means of communication, and too rigid adherence to antiquated methods, have all contributed to check progress, but under the present *régime* the first two obstacles have been removed, and the third is gradually passing away. Austria-Hungary now ranks third of the European grain-producing countries, being surpassed by Russia and France. The cereals and animals exported in 1907 were valued at about £10,000,000.

Vines are extensively cultivated, especially in Hungary, which produces Tokay, one of the finest wines known. The average annual production of wine is more than 180 million gallons.

Forestry is naturally a considerable feature of national industry, and is thoroughly and systematically studied. The timber of various kinds (oak, beech, maple, and pine form the bulk) reaches the large annual aggregate of 7,240 million cubic feet.

Pastures of almost unlimited extent abound in Hungary, Transylvania, Galicia, and Dalmatia. Austria and Hungary have for centuries been noted as horse-breeding countries, and still bear a high reputation. The Ministers of Agriculture both encourage breeding, by a system of annual grants to private owners of stallions. There are three government studs in Austria, and three in Hungary, established for the improvement of the various breeds. Most of these studs have been in existence for about a century. Annual horse shows are held in each district, at which money prizes and medals are awarded by government commissioners. Many wealthy landowners have private breeding establishments. The Austrian Stud Book is issued annually. There is a great partiality for Arab blood, several noblemen having devoted much time and money to the maintenance of the purest breed. The best horses for general purposes are said to come from Transylvania. Hungary supplies the greatest number. In the whole monarchy the number of horses is estimated at more than 3½ millions.

Cattle are reared chiefly by the peasantry in the Alpine districts, especially the Tyrol and Styria. There is room for much greater development in this department of farming, which is unnecessarily limited to certain provinces. Sheep-farming received a notable impulse by the introduction in 1763 of the merino sheep into Moravia, Silesia, and Bohemia. At the present time these countries do not maintain their superiority, and the greater part of the sheep are raised in Hungary. Total for the monarchy, about 14,000,000.

Fishing is an important industry on the Adriatic coast, and employs 12,500 fishermen, with 3,200 boats, the "takes" realising as much as 2,500,000 florins in the course of the year (1 florin = 1s. 8d.).

Mining is one of the chief industries of Austria, and might be carried on to a greater extent than is now the case. The mines are partly state property, and partly owned by private individuals. Despite the facts that mining has been an important pursuit for centuries, and that the mineral wealth of the monarchy is enormous—it is not surpassed in any European country—the annual output is quite insignificant. Coal, in particular, should receive far more attention. Seeing that this mineral is found plentifully in all the Crown lands of both Austria and Hungary—with the single exception of Salzburg—it seems strange that Hungary should import increasingly large quantities of this mineral every year. The consumption of coal in Hungary is between three and four million tons, of which about 20 per cent. is imported.

In the iron mines the same lack of enterprise keeps the production below what might reasonably be expected. Taking Hungary again as an example, we find that the total output of gold, silver, iron and other metals is worth little more than £2,330,000. In getting this, some 68,000 miners are employed, including about 2,080 women and 6,000 children under 16 years of age. In Austria there are about 127,000 miners, besides about 8,300 engaged at smelting works. The production of pig-iron in the whole monarchy is 816,000 tons.

Salt mines are worked at Halicz, Wieliczka, and Bochnia in Galicia, Maros Ujvar in Transylvania, Sugatag in Hungary, and many other places. The mine at Bochnia is nearly two miles long, a furlong wide, and 1,000 feet deep, while that at Wieliczka forms a regular underground town, about a mile long and half a mile wide, with streets, churches, etc., cut out of the salt. With all these natural facilities, the monarchy only takes the fifth place among salt producers. The annual value is about £1,300,000, and the industry employs some 10,000 men. It is a government monopoly.

Manufactures have advanced greatly during the last 25 years. One of the oldest is that of linen, some of which is still spun, and the greater part woven, by hand labour. Bohemia, Silesia, and Moravia are the chief seats of this industry. Cotton fabrics are produced in increasing quantities in the same districts, and woollen cloths in Moravia and Lower Austria. Bohemia has a world-wide reputation for the manufacture of various kinds of glass, and the Tyrol has long been noted for the production of carved woodwork. Paper is made chiefly in Bohemia and in or near Vienna. Beet sugar is manufactured principally in Bohemia. About 86,000 persons are engaged in the trade at some 230 factories. Brewing is an important trade, especially in Lower Austria and Bohemia. There were about 1,300 breweries at work in 1907.

Commerce.—Austria has never taken high rank as a commercial nation. The mountainous character of many of her provinces, and her relatively small sea-board, have offered serious natural obstacles to development in this direction. Of late, however, much has been done by commercial legislation and improvement of the means of transport, to foster native industries, with marked beneficial results. The chief want now appears to be an increase of enterprise in the employment of capital, and greater confidence in commercial undertakings independent of government aid or patronage.

Nearly two-thirds of the whole foreign commerce of the monarchy is carried on with Germany; its next best markets are Roumania, Russia, Italy and Servia. The direct trade with Great Britain is comparatively small, the exports from Austria to this country average about £2,000,000, and the goods imported direct from Great Britain about £1,500,000. The staples exported to Britain are wheat, flour, and wood; the main imports from Britain are cotton goods, iron, and machinery.

For the purposes of foreign trade Austria-Hungary forms a single customs union, embracing also Bosnia, Herzegovina, and the principality of Lichtenstein, but exclusive of Trieste and Fiume, which are free ports.

The *shipping* trade is limited by the small accommodation. The progress made in the last few years is shown by the following figures: in 1880 Austria owned 113 steam and 8,097 sailing vessels; in 1907 these numbers had increased to 296 and 13,983 respectively, over 100 of the steamers being of sea-going class. At Trieste alone in 1906 there entered 10,090 vessels, with an aggregate of 3,420,175 tons, and cleared 10,091 vessels, 3,426,407 tons. About 89 per cent. of this tonnage was Austrian, the rest mainly French, Italian, and English. No bounties or subsidies are granted in aid of ship-building, but materials and fittings are imported free of duty.

Communications.—Although Austria claims the credit of having possessed the first (horse) railway on the continent of Europe, that between Linz and Budweis, completed in 1827, her railway system was until quite recently a long way behind that of some of her neighbours. Within the last twenty years, however, the increase has been very great, particularly in Hungary, where the length of lines, which in 1867 was only about 1,400 miles, now amounts to 12,100 miles. The total mileage for the whole monarchy was, in 1907, 25,526 miles, besides 1,014 in Bosnia and Herzegovina. Part of this consists of state railways, part of railways owned and worked by companies, and part of lines owned by companies.

The number of passengers carried in 1907 was over 314,000,000, and the goods amounted to 205,000,000 tons. This may compare rather unfavourably with the traffic returns of other nations, but it is to be borne in mind that the Austrians, and more especially the Hungarians, are scattered over a wide tract of country, where distances are great, and incentives to travel fewer than in many other lands. Railway fares, too, were till recently far too high for the means of the lower orders of the population. This last fact led the Hungarian Minister of Public Works and Communications to introduce in 1889 the radical reform known as the "Zone Tariff," wherein the station from which the traveller starts is taken as the centre of 14 zones, the fare being the same to all other stations in any zone, *i.e.* at any equal radial distance. The introduction of this system (limited to the railways under state control) was followed by a large increase of traffic, and the example has been followed by the adoption of a modification of it, known as the "Kreuzer Tariff," on the Austrian state lines, but neither system can yet be said to have passed out of the experimental stage. It should be added, however, that some of the railway companies are adopting similar tariffs. The reduction of fares in Hungary is said to have been at the rate of about 40 per cent., but, on the other hand, return tickets and some other privileges have been abolished.

The *roads* amount in total length to 63,920 miles. They are of varying degrees of excellence, some of those in the Alps, from the Tyrol and Illyria to Lombardy, being admirably constructed, while in Hungary, mainly for want of suitable material, many of the roads are of very poor quality.

Waterways.—The Danube is navigable for sailing-vessels below Pesth, and for specially built steamers as far as Ulm. The Danube Steam Navigation Company, the principal steamboat owners in Vienna, carried in 1907 over 2 millions of passengers, and over 2 million tons of freight. On the Elbe the freight reached to about 500,000 tons. Several other rivers are navigable through part of their length. In Austria there are 2,400 miles of rivers and canals open to timber rafts only, 4,200 miles to barges, etc., including 830 to steamers, giving a total of 6,600 miles; in Hungary 3,200 miles. Canals are almost confined to the Hungarian plains. The most important are the Bega Canal, and the Franzens Canal between the Theiss and the Danube. The Schwarzenberg Canal, which connects the Elbe and Danube navigations, is for timber only. There are many smaller ones, constructed chiefly for the purpose of draining the Hungarian marshes.

Army.—The military system comprises (1) the Active Army; (2) the Austrian Landwehr, and (3) the Hungarian Landwehr, or "Honvéd." The whole is organised into fifteen army corps, each corps consisting of two divisions of the active army, and one division of Austrian or Hungarian Landwehr. In the event of war these corps would form three armies, one of five and two of four corps; the fourteenth corps being specially assigned to the Tyrol and the fifteenth to Bosnia and Herzegovina. There is also a separate military command at Zara, in Dalmatia, for local defence. The total number of infantry divisions would be 48, on a general mobilisation, but about 17 of these are non-existent during peace.

The cavalry are formed into brigades of two regiments, attached to the army corps, and five independent cavalry divisions. There are in all 42 regiments, 15 of Dragoons, 16 of Hussars, and 11 of Uhlans, each having six field squadrons of five officers and 171 men (peace strength), besides a dépôt squadron and the cadre of a reserve squadron; there are also 11 officers and 80 men on the regimental and "divisional" staff (three squadrons form a "division"), and two escort detachments of an officer and 43 rank and file each. Thus a cavalry regiment at full strength requires some 1,500 horses. Their arms are the carbine and the cavalry sword. In the Honvéd cavalry the squadrons are, at peace strength, only one-fourth of their full numbers, and their fifth and sixth squadrons are not intended to take the field with the regiment, but to act as

divisional cavalry with the Honvéd divisions; in other respects they resemble the Hussars of the active army.

There are 14 regiments of corps artillery, having 153 heavy, 28 light, 16 horse, and 12 mountain batteries. Besides these there are 12 battalions of garrison (fortress) artillery, each with 5 active companies and one company cadre. There is no artillery in the Landwehr.

The infantry regiments, of which there are 102, contain 2 active and 3 reserve battalions a piece, besides the dépôt battalion. The Tyrolese Jæger (Rifle) Regiment has 7 battalions, and there are 26 other battalions of rifles. Hungary, it may be observed, is the country in which Hussars originated, while Austria first produced the "rifleman."

The Landwehr of the Tyrol and Vorarlberg is of a specially local character; it is organised expressly with a view to mountain warfare, and is not intended, as a rule, to be employed outside its own district. With this exception, the Landwehr, both Austrian and Hungarian, while differing in some important details of economy and administration from the active army, must be reckoned as an integral part of the regular military system, its battalions, etc., being intimately associated with their "active" comrades in a manner designed to insure efficient combination when mobilised. The Austrian Landwehr is (since 1889) organised in 22 regiments of from three to five battalions, and named after the chief town in each battalion district. The battalions are numbered throughout from 1 to 82. The recruits of the Landwehr battalions are, in peace, eight weeks with the "instructional cadres." The Hungarian Landwehr has 92 battalions and 34 "of the second line" intended as reserves, besides 10 Hussar regiments. Most of this is potential rather than actual strength, battalions being represented in peace by cadres of a few men. The infantry weapon is the Männlicher magazine rifle.

The forces include 10 battalions of Engineers, 5 of Pioneers, 15 divisions of train, and ambulance, provision, and other departmental corps.

Recruiting is conducted on the basis of universal liability commencing at the age of 21, the term of service being three years with the colours, seven in the reserve, and two in the landwehr. Recruits who voluntarily enlist and provide their own equipment may reduce their service with the colours to one year. The various nationalities affect recruiting in certain definite ways; thus, Poland supplies the bulk of the Uhlans, Hungary the Hussars, and the mountain districts the Rifles. There are no *corps d'élite* corresponding with the "Guards" of other European armies.

Outside the active and Landwehr troops is the organisation of the *Landsturm*. In this are included all males between the ages of 19 and 42, who are not otherwise serving.

The accompanying table gives the actual strength of the army for 1908:—

	Officers.	Men.	Horses.
Active Army	22,139	283,512	60,197
In Bosnia and Herzegovina	901	10,048	1,871
Total Active Army	23,040	293,560	62,068
Austrian Landwehr	3,689	37,273	4,501
Hungarian Landwehr	2,680	25,914	4,702
Total Peace Establishment	29,408	356,747	71,271

Navy.—All matters connected with the navy are in the hands of the naval department of the Ministry of War.

The navy is mainly a coast defensive force, maintained in a state of high efficiency, and including a flotilla of monitors for the Danube. It is recruited partly by a levy from the seafaring population and partly by voluntary enlistment. The chief port for the navy is Pola, and there are other establishments upon the Dalmatian coast. In 1908 the strength was 12 battleships, 9 cruisers, and a number of torpedo boats. Three battleships and several torpedo boats are in hand.

The *personnel* of the navy is as follows:—Officers and cadets, 816; doctors, chaplains, etc., 583; men, about 11,500. The naval arsenal is at Pola.

Art and Music.—Few names of more than local celebrity occur in the annals of painting in the past, but it is no light boast that one of the greatest masters of any age, Albrecht Dürer, though born at Nüremberg, was the son of a Hungarian father. In modern times, Hans Makart in Austria and Munkacsy in Hungary have nobly upheld the reputation of the monarchy.

In music, on the other hand, Austria has long held a foremost position; indeed, Vienna has been called the musical capital of Europe. It is sufficient to recall the names of Haydn and Mozart to justify the title, without referring to the many eminent musicians of more recent date who have lived and worked there.

Austrogæa, an approximate synonym of Notogæa (q.v.).

Auteuil, a suburb of Paris, formerly a separate village. It is celebrated as the place of residence of several famous literary men.

Authorised Version, the English translation of the Bible at present in general use. Its publication was suggested at the Hampton Court Conference between Episcopalians and Puritans held in 1604. King James I. entered warmly into the project, which was carried out (on the basis of previous translations) with the co-operation of the Universities. The translation was published in 1611, and appointed to be used in churches. A "Revised Version" of the New Testament published in 1881, and of the Old Testament in 1885, have failed to supersede it, though both represent the original much more correctly.

Autochthones (Gk. *autos*, self, *chthon*, earth), *sprung from the soil;* a term applied to those Greeks (as the inhabitants of Attica) who claimed to have inhabited their country from time immemorial—as contrasted with *e.g.* the Dorians, who had immigrated into Laconia. The corresponding Latin word is *aborigines.*

Auto da Fé (Portuguese, *act of faith*), the ceremony accompanying the public declaration of the sentence passed on heretics and certain other criminals by the Inquisition. The condemned persons (barefooted, each wearing a fantastic robe called the *San Benito*, and a pointed cap) walked to church in procession headed by Dominican friars with the flag of the Inquisition, and followed by carts carrying fantastically decorated coffins containing the bones of malefactors. After hearing a sermon on the true faith they were formally delivered to the secular power, and a few hours later were burnt alive. The most famous auto da fé took place at Madrid in 1680.

Autograph (Gk. *autos*, self, and *grapho*, I write), something written in the handwriting of its author, as contrasted with copies, or with matter taken down from dictation. Autographs of celebrated men are frequently collected.

Autogravure. [PHOTOGRAVURE.]

Autolycus, (1) in classical mythology, was a son of Hermes or Mercury by Chione, and he inherited the most disagreeable element in his father's character, viz. his propensity for stealing. His daughter Anticlea became the mother of Ulysses. The name became synonymous with thief, and is thus introduced by Shakespeare into *The Winter's Tale.* (2) A Greek mathematician of the fourth century B.C. whose birthplace was Pitane in Asia. Two of his treatises on *The Sphere in Movement,* and *The Rising and Setting of the Stars,* have come down to us in a Latin version.

Automatism, as applied to animal life, involuntary or automatic movement; the term is also used to denote the power of initiating life from within the organism apart from any external influence.

Automaton (Gk. *automatos*, of one's own accord) a machine having the power of spontaneous movement, usually applied to machines so constructed as to imitate human or animal actions. Among famous automata, a duck, made by Vaucanson, and exhibited at Paris in 1741, which swam, dived, drank, etc., the "piping bullfinch," exhibited at the Exhibition of 1851, and the moving figures in connection with the Strasburg clock, are well known. Kempelen's "automaton chess-player" was not a true automaton, being really worked by a cripple concealed in the interior. Mr. J. N. Maskelyne's figures "Psycho" and "Zoe" (first exhibited in London 1875 and 1877 respectively) may also be classed as automata. The question whether "animals are automata" (*i.e.* act as machines without their action being due to their consciousness) has been often discussed from Descartes downwards. Self-acting machines, requiring but little attention, are sometimes called automatic.

Autonomy, the power or right of self-government; the governing of a state or district by its citizens.

Autopsy, a post-mortem examination.

Autotype (Gk. *autos*, self; *typos*, lit. stamp), a permanent print produced from a photographic negative as follows:—The paper on which it is printed is coated with a film of bichromatised gelatine, in which lampblack is held in solution. The negative being placed over it the light hardens those parts of the film to which it is admitted; the other parts are afterwards washed away, leaving a permanent print. The process is better suited for the reproduction of oil paintings than of engravings or of etchings.

Autozooids, the zooids in an ALCYONARIAN, which are provided with tentacles and generative organs. [SIPHONOZOOIDS.]

Autumn (Lat. *autumnus*, perhaps from *augeo*, I increase, more probably from *avĕre*, to be well), the third season of the year, usually taken to include, in Great Britain, August, September, and October; in France and North America, September, October, and part, or whole, of November. Astronomically, however, it begins (in the N. hemisphere) at the autumnal equinox and ends at the winter solstice (22 Sept. to 21 Dec.). In S. hemisphere it corresponds in time to the spring in the northern.

Autun (Lat. *Augustodunum*), an ancient town in the department of Saône and Loire, France, picturesquely situated on the river Arroux at the foot of a lofty wooded range, 28 miles from Châlons. Its origin was traced to the Phocæans, and Cæsar mentions the place as Bibracte, capital of the Ædui, and its present name was derived from Augustus. It enjoyed in early times a distinctive constitution, and later was celebrated for its school of rhetoric. It was the scene of the rising of Sacrovir; was captured and destroyed by Tetricus; Constantine rebuilt it, and in the 8th and 9th centuries it was sacked by the Saracens and Norsemen successively. It then became part of the duchy of Burgundy. Talleyrand was bishop, and Marshal Macmahon was born here. It contains a handsome cathedral, and in St. Martin's

church the body of Brunehaut or Brunehilda lies buried. There are interesting Roman remains, some manufactories of carpets, hosiery, etc., and a trade in agricultural produce.

Auvergne (classic *Arverni*), an ancient province of France which embraced the modern departments of Puy-de-Dôme, Cantal, and part of Haute Loire. The Arverni were rivals of the Ædui for supremacy in Southern Gaul, and Vercingetorix, their chief, stubbornly resisted Cæsar. Louis XIII. united the province to the crown of France in 1610. The river Rue divides the province into Lower Auvergne or Limagne, which is fertile, and contains the towns of Clermont, Riom, and Aigueperse, and Upper Auvergne, a rugged district, its principal towns being St. Flour, Chaudes-Aigues, and Aurillac. The mountains of Auvergne, all of them extinct volcanoes, are connected with the Cevennes by Mount Margerides, and fall into four groups—Le Plomb du Cantal, Le Cézallier, Le Mont Dore, and Le Puy-de-Dôme. The Puy de Sancy (6,200 ft.) is the highest peak. The thermal springs at Mount Dore, Royat, and elsewhere bespeak the volcanic nature of the soil. The chief rivers are the Dordogne and the Allier, but smaller streams are fairly abundant. Amongst the leading products are iron, lead, copper, and coal, and quantities of cattle are raised. The Auvergnats retain their primitive characteristics, and are a rough, hardy, industrious race. They supply all the water carriers and street sweepers to Paris, and speak a strange dialect.

Auvergne, DE LA TOUR D', THÉOPHILE, known as "The First Grenadier of France," an illegitimate descendant of the illustrious house whose name he bore, was born in 1743. He entered the *Black Musketeers*, and rose to the rank of captain, commanding at the beginning of the revolutionary wars the Imperial Column of Grenadiers. In 1795 he had retired, when the son of an old friend was drawn for the conscription, and La Tour d'Auvergne offered himself as a substitute. He served as a private, and no persuasion could induce him to accept promotion. He was killed in 1800, but for many years his name was kept on the roll-call of the regiment. He was the author of several treatises as well as a history of the antiquities of Brittany.

Auxerre (Lat. *Altisiodurum*), an ancient city of France, now the capital of the department of Yonne, but formerly the chief town of the county of Auxerre, which with other domains formed the Auxerrois. Auxerre stands on the river Yonne, about 90 miles S.E. of Paris. It possesses a remarkable Gothic cathedral, a church dedicated to St. Germain, wherein lie the remains of the early counts, and an old castle. St. Germain was born here, and Amyot once held the extinct bishopric. Being close to the Burgundy vineyards it does a large business in wine, and manufactures catgut, woollen fabrics, earthenware, etc.

Auxonne, a fortified town in the Côte d'Or, France, on the river Saône. It has a curious castle built by Louis XII., a school of artillery, cannon foundry, and powder factory. The Sires d'Auxonne enjoyed almost royal independence in the Middle Ages, and in 1526 the town refused to be handed over to Spain by the treaty of Madrid.

Auxospore, a large cell occurring in Diatoms which divides repeatedly, the daughter-cells becoming smaller at each division until one of them becomes another auxospore.

Ava, the capital of the Burmese Empire from 1364 to 1740, and from 1822 to 1838, is situated on the Irawadi river at the confluence of the Mytnge and the Myltha, which wash the city on the E., S., and W. It is about six miles below Amarapura, the old, and Mandalay, the present capital. The earthquake of 1839 almost destroyed the place, but a few great temples and a royal palace remain.

Ava. [KAVA.]

Aval. [BAHREIN.]

Avalanche, the slipping of an accumulation of snow or ice down a steep declivity in Alpine regions. Avalanches are sometimes classified as ice, snowy and drift or dust avalanches. Ice avalanches occur in summer, being detached from glaciers; snowy avalanches occur in spring, sliding down habitual channels, which they polish; and drift avalanches occur in winter after heavy falls of snow, consisting of loose snow, accompanied in its fall by a rush of wind. Avalanches, especially the two latter kinds, often prove very destructive, so that the growth of forests is encouraged or masonry is erected to ward them off; but their most important action is indirect, in blocking the course of streams, so as to form temporary lakes and cause floods.

Avalon, AVALLON, or AVILION, the soul-kingdom of Celtic mythology, the *Ynys yr Avallon* (Island of Apples) or *Ynysvitrin* (Glass Island) of the Welsh. This last name seems to connect it with the *Glasberg* (Glass Mountain) of Teutonic myth, which has a suspicious likeness to Glastonbury, where, according to one legend, King Arthur was buried; while another—adopted by Tennyson in the *Passing of Arthur*—tells how the king was carried

> "To the island-valley of Avilion,
> Where falls not rain, or hail, or any snow,
> Nor ever wind blows loudly; but it lies
> Deep-meadow'd, happy, fair with orchard lawns,
> And bowery hollows, crown'd with summer seas."

Avares, a branch of Huns, who about the middle of the sixth century were driven from their home near the Altai Mountains by Chinese invaders, and ultimately forced their way into Western Europe, and held large tracts of territory in Germany N. and S. of the Danube, and in Russia as far as the Don. They were conquered and Christianised by Charlemagne. The Avares still give their name to a town and a large district (2,287 square miles) in the old province of Leghistan, Persia, on the N.E. side of the Caucasus. The population, numbering about 30,000, consists of wild predatory mountaineers, nominally subject to Russia.

Avaricum. [BOURGES.]

Avatar, the incarnation of a deity, or the vehicle of such incarnation. The term is chiefly used of the manifestations of Vishnu (q.v.), but

might with propriety be applied to the incarnation of Siva in Hunaman, the monkey-god, or of Jupiter in the bull which bore away Europa. Tylor relates that a Hindu, "being shown the pictures of Matthew, Mark, Luke, and John, with their respective man, lion, ox, and eagle, explained these quite naturally and satisfactorily as the avatars of the four Evangelists."

Avatcha. [PETROPAULOVSKI.]

Avebury, ABURY, or ABERY, a village in Wiltshire, about 6 miles W. of Marlborough. The village is situated in the midst of the remains of a large Druidical structure consisting of 100 monoliths, each about 16 feet in height and 40 feet in circumference, forming a circle 1,000 feet in diameter. Within this area are two smaller circles of double stones,

AVEBURY, FROM THE SOUTH.
(*From a photograph by W. J. Barterstock, Marlborough.*)

enclosing the one a maenhir or column, the other a dolmen. Two barrows exist in the neighbourhood, viz. Silbury Hill and Hakpen Hill. It has been conjectured that the Avebury remains commemorate the last of the twelve great Arthurian battles, the scene of which was Badon or Waden Hill.

Avebury, LORD. [LUBBOCK, SIR JOHN.]

Aveiro, a port in the province of Beira, Portugal, at the mouth of the river Vouga, about halfway between Oporto and Coimbra. It is the seat of a bishopric and college. There is a large trade in fish, salt, oil, wine, and fruit.

Avellino (classic *Abellinum*), a fortified city and chief town of a province of the same name in Campania, Italy, at the foot of M. Vergine, 59 miles E. of Naples. A bishopric, royal college, and cathedral are found here, but the streets are narrow, gloomy, and tortuous. The neighbourhood produces quantities of chestnuts and hazel nuts, and there are some local manufactures and large dye works. Not far distant are the famous Caudine Forks (Val de Gazzano) where the Romans suffered defeat from the Samnites in 321 B.C.

Ave Maria (Lat. *Hail Mary*), a common invocation to the Virgin Mary, in use at the end of the seventh century, but formally sanctioned during the twelfth. A clause was added at the end of the sixteenth century. Pope John XXII. ordered in 1326 that every Catholic should repeat it thrice at the ringing of the bells calling to prayer at morning, noon, and night. Hence the bells (still rung in Roman Catholic churches) are often called the "Ave Maria," or ANGELUS (q.v.), in allusion to the opening words of the prayer, taken from the address of the Angel Gabriel to the Virgin (Luke i. 28).

Avenger of Blood, the term applied to the person on whom, by the Mosaic law, it devolved to punish death by violence. He was the nearest male relative of the person slain. (*See* Deut. xix. 12; Numbers xxxv. 9–34; Joshua xx.)

Aventinus, a Bavarian historian, JOHANN THURMAYER, who took this name from Abendsberg, where he was born about 1476. He was appointed tutor to the sons of Duke Albert of Bavaria, and wrote at his patron's desire his *Annales Boiorum*, a valuable record of early German history, which, however, brought upon him a charge of heresy. He was acquitted and died at Ratisbon in 1534.

Aventinus, MONS (now *Monte di Santa Sabina*), the most southerly of the seven hills on which ancient Rome stood, lies between Mons Cœlius and the Palatine. It was included within the city by Ancus Martius, and as an outlying quarter was the scene of several secessions of the *plebs*. Temples of Diana and of Liberty with other monuments occupied the site.

Aventurine, a name applied to varieties of quartz and felspar, containing spangles of mica and of iron oxide respectively, from their resemblance to a kind of Venetian glass so called from having originated *à venture*, by accident, in the upsetting of some metallic foil into the molten glass.

Average. A sum intermediate to a number of different sums, obtained by adding the various sums together and dividing the result by the number of sums which have been added: for instance, the average of 2, 4, 6, and 8 is 5. [GENERAL AVERAGE. PARTICULAR AVERAGE.]

Averno, or TRIPERGOLA (classic *Avernus*), a small lake in Campania, Italy, about 10 miles W. of Naples, at the head of the Bay of Baiæ. It has a circumference of about one and a-half miles, and probably occupies the hollow of a crater, for its waters exhaled such mephitic vapours that no birds, according to ancient story, could fly over them, and the name was supposed to be derived from the Greek *aornos*, birdless. Agrippa connected it by a channel with the Lucrine Lake, but in 1538 this latter was filled up by a volcanic eruption. In classic mythology Avernus was looked upon as the entrance to the infernal regions. Recently the banks have been drained and laid out in charming gardens, a channel connects the lake with the sea, and the surrounding district is cultivated. The grotto of the Cumæan Sybil is still shown here.

Averrhoës, or IBN-ROSCHD, ABOU-WALID MOHAMMED IBN-AHMED, his literary name being a corruption of his patronymic, stands with Avicenna (q.v.) at the head of the so-called Arabian school of philosophy. He belonged to a good Moorish family, and was born about 1126 at Cordova, then a learned city. Averrhoës devoted his life mainly to the study of Aristotle. With unflagging industry he annotated and expanded the doctrines of the Stagirite, earning for himself the title of "The Commentator." He appears to have adopted the Oriental theory of emanations, and to have held that the perishable and individual soul is a part of an immortal and universal intelligence. He also distinguished between the active and passive soul, the provinces respectively of reason and faith. Such doctrines were as offensive to the devout believers in the Koran as to the orthodox scholastic theologians. Averrhoës was banished for a while from Cordova, and his views, at the instigation of St. Thomas Aquinas, were condemned by the University of Paris in 1240. He wrote treatises on medicine, astronomy, and law, and exercised the functions of Kadi in Morocco, where it is said he died in 1198 or 1206. M. Renan has given an exhaustive account of him in his *Averroës et l'Averroïsme.*

Aversa, a town in the Terra di Lavoro, Italy, 3 miles from Naples. The plain in which it stands is covered with vineyards and orange groves, and is greatly resorted to by the Neapolitans, who much appreciate the sweetmeats for which the place is famous. Besides being the seat of a bishopric, Aversa has a large foundling hospital and lunatic asylum. The Normans first established themselves here. In the castle, once a royal residence, now a palace, Andreas of Hungary, husband of Joanna I. of Naples, was strangled (1345).

Aves, Birds (q.v.), a group of vertebrates forming with the reptiles the division Sauropsida.

Avesnes, a fortified town in the department of Nord, France, situated on the Greater Helpe about 30 miles S.E. of Lille. It was founded in the tenth century, and has a fine cathedral with a tower 330 ft. high. Serges and hosiery are made here, and marbles are dressed.

Aveyron (anc. *Veronius*), a river of France, which rises near Severac, and after a south-westerly course of about 160 miles joins the Tarn near Meauzac. It gives its name to a department, formerly part of the province of Guienne, and occupying a rugged tract between the Cévennes and the Mountains of Auvergne. The plains to the west are fertile, and produce the celebrated Roquefort cheese. Valuable metals are found in the hilly portion. Rodez is the chief town. Area of department 3,376 sq. miles.

Avicebron, or SOLOMON IBN GEBIROL, a Jewish philosopher of Malaga, who flourished towards the end of the eleventh century. His treatises entitled *The Source of Life* and *The Source of Wisdom* produced a powerful effect on Aquinas, Albertus Magnus, and other schoolmen, and he undoubtedly gave to the Aristotelianism of the East an acute and original impulse. The identity of this author was only established in 1857 by Munk of the French National Library.

Avicenna, "the Prince of Physicians," was born about 980 A.D. in Bokhara. In learning he was precocious, and during most of his somewhat stormy life he acted as physician to various emirs. He died at Hamadân A.D. 1037. His chief work, *The Canon of Medicine,* based upon Galen, modified by Aristotle, was a text-book in Europe until the middle of the seventeenth century. Upwards of 100 treatises are ascribed to him, dealing with the entire circle of the sciences, as then understood, from an Aristotelian standpoint. He maintains the immortality of individual souls with Platonist arguments, his theology being largely Neo-Platonist in origin.

Avicularia, or bird's-head processes, certain zooids (or individuals) in a bryozoan colony, which are modified to the shape of birds' heads and are supposed to act as organs of defence or prehension. [BRYOZOA.]

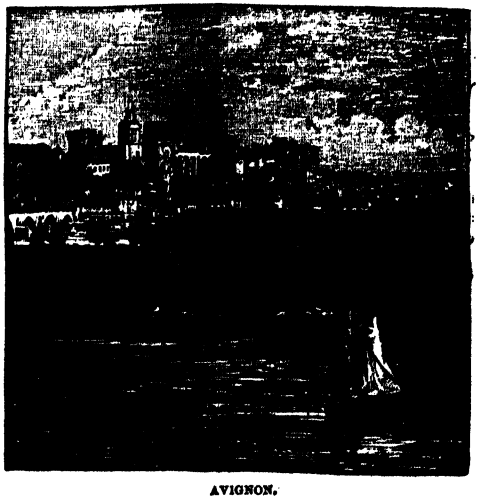
Aviculidæ, a family of LAMELLIBRANCHIATA, ranging from the Silurian upwards.

Avienus, RUFUS FESTUS, a Roman versifier and geographer who served twice as proconsul in the 4th century under Theodosius. He translated into Latin the *Phænomena* of Aratus, and the *Periegesis* of Dionysius, and he composed an original work, *Ora Maritima,* of which a fragment only is extant.

Avifauna, the birds of a country or zoological region considered without reference to the other animals inhabiting such country or region. The name is often used as the title of a work treating exclusively of the birds of a particular district.

Avigliano, a town of some importance in the province of Potenza, S. Italy. It is near the town of Potenza.

Avignon (classic *Avenio*), the capital of the department of Vaucluse, France, an ancient and



AVIGNON.

beautiful city standing on the left bank of the Rhone near the confluence of the Durance. It was

founded by the Phocæans about 539 B.C. and was for many years the capital of the Cavares. Under the Romans it was included in Gallia Narbonnensis, and on the disruption of the empire passed successively into the hands of the Burgundians, Goths, Franks, and Saracens. After the defeat of the latter by Charles Martel it was incorporated with the dominions of Charlemagne, and on their division it fell as part of the kingdom of Arles to the Counts of Toulouse and Provence jointly, and became a kind of republic. In the war of the Albigenses it was taken from Raymond of Toulouse (1226) by Louis VIII., and in 1273 was ceded to the Pope by Philip III. From 1309 to 1377 it was the residence of the Popes, and was purchased by Clement VI. from Joanna I. of Naples. The anti-popes established themselves there from 1379 to 1418, when Charles VI. of France drove out Benedict XIII. Avignon remained a Papal possession until 1791, at which date the French seized it. The palace of the Popes is preserved, and the fine Gothic cathedral dates from the twelfth century. The ancient walls still surround the town, with a noble boulevard outside them. Some of the older streets are narrow and gloomy, but the newer quarters, the bridges, and the many public buildings rival the architecture of any city in France. A large trade is carried on in wine, oil, dried fruits, olives, almonds, and other local produce. Silk is grown and manufactured in considerable quantities, and the preparation of dyes from madder is a staple industry. Railways connect the town with Paris, Marseilles, and Cette.

Avila, the capital of the province of the same name in Spain. It is situated on the river Adaja at a height of 3,000 feet above sea-level, the Guadarama range rising behind it. It was formerly one of the most prosperous cities in Spain. Here Henry IV. was deposed in 1465, and here in 1520 Padilla started the league against Charles V. It possesses a bishopric and a handsome cathedral, but the university has been suppressed. The province has an area of 2,980 square miles.

Avila y Zuniga, Louis D', born in 1500, was employed by Charles V. as ambassador to the Popes Paul IV. and Pius IV. with a view to expediting the procedure of the Council of Trent. He accompanied the emperor during the war of 1546–7 against the German Protestants and wrote a history of the events, and also of the war in Africa.

Avison, Charles, a musician of merit who was born at Newcastle-on-Tyne in 1710. After studying under Geminiani in Italy, he returned to become organist in his native town. He wrote in 1752 an *Essay on Musical Expression*, which attracted some attention, as it decried Handel and lauded the Italian school. We have little of his music left us, but the music of *Sound the Loud Timbrel* occurs in one of his concertos.

Avlona, or Valona (Gk. *Aulon*), a port in Albania, Turkey in Europe, on the gulf of the same name, which opens into the Adriatic. It is unhealthy owing to the proximity of marshes, but it enjoys a considerable trade with the coast and with Brindisi, and is a port of call for the Austrian steamers. Tortoise-shells, and *Valonia*, a product of the oak for tanning, are largely exported.

Avoca, or Ovoca (Kelt. *meeting of the waters*), a river and valley of County Wicklow, Ireland. Its chief title to fame lies in the fact that Thomas Moore speaks of it as the "vale in whose bosom the bright waters meet," referring to the junction of the Avonmore and Avonbeg.

Avocado, or Alligator Pear, the fruit of *Persea gratissima*, a small Lauraceous tree of tropical America, now cultivated as a dessert fruit throughout the tropics.

Avocet, any bird of the genus Recurvirostra, which contains six species, distributed throughout the world. The Avocets, distinguished by their long, slender, up-curved bill, are now classed with the Waders, but were formerly placed with the Swimming Birds, on account of their feet, which are completely webbed, though they never swim unless compelled to do so. The Common Avocet (*Recurvirostra avocetta*) is about eighteen inches long, of which the bill is about one-sixth; top of

Avocet (*Recurvirostra avocetta*).

the head, neck, back, lesser wing-coverts, and primaries black, rest of plumage white, legs and toes pale blue. It is common in Holland, ranges over Europe, and occurs as far south as the Cape of Good Hope. It was formerly a frequent visitor to the eastern counties, and frequently remained to breed, but is now of very rare occurrence. Sir T. Browne, who includes it in his *Birds of Norfolk*, in commenting on the strangely shaped bill of the bird, says that "it is not easy to conceive how it can feed." But the thin flexible bill is admirably adapted for scooping and probing the soft mud, while the mandibles act as strainers and retain the prey. The bird was locally known as the Barker and Yelper, from its cry, and as the

Shoeing-horn, Scooper, and Cobbler's Awl Duck, from the shape of its bill. The American species (*R. americana*), which ranges over the whole continent, has the bill less recurved than the European species, and the coloration of the head is chestnut.

Avoirdupois (old Fr. *aveir de pois*, lit. goods of weight), the system of weights applied in the United Kingdom to all goods except medicines, precious metals, and precious stones. The grain is the foundation of the system. A cubic inch of water at standard temperature weighs 252·458 grains; 7,000 of such grains make a pound avoirdupois (=453·6 grams in the French metric system). The system was introduced from Bayanne about 1300, and is of Spanish origin. It is also in use in the United States, except that usually the hundredweight there is 100 lbs., and the ton 2,000 lbs., instead of, as in Great Britain, 112 lbs. and 2,240 lbs. respectively.

KILCHURN CASTLE, LOCH AWE.
(From a Photograph by Messrs. G. W. Wilson & Co., Aberdeen.)

Avola (classic *Abolla*), a port of Sicily, 12 miles from Syracuse. It stands on the ruins of a former town destroyed by earthquake in 1693. The honey of Hybla was exported hence, sugar is grown here, and the wines and fruits are excellent. A large coasting trade is done with Italy. A curious subterranean passage has been formed in the neighbourhood by the waters of the river Cassibilli.

Avon, a Keltic word meaning *river*, and probably allied to *Aa*, which has attached itself to many streams in England, Scotland, Wales, and on the Continent.

1. Shakespeare's Avon rises in Northamptonshire near Naseby, traverses Warwickshire, having Rugby, Warwick, with its castle, and Stratford on its banks, touches Worcestershire, and entering Gloucestershire joins the Severn, after a course of 100 miles, at Tewkesbury. 2. A river that rises in Wiltshire, and passing Stonehenge and Salisbury, skirts Ringwood Forest in Hants, and falls into the Channel near Christchurch. 3. The Bristol Avon rises also in Wiltshire, flowing N. past Bath and Bristol and falls into the Bristol Channel, being navigable up to the city. 4. Another Avon flows down from the mountains of Glamorgan and enters the Bristol Channel at Aberavon. In Scotland there are three Avons: one in Banff, a tributary of the Spey; a second in Lanark, that joins the Clyde near Hamilton, and a third falling into the Firth of Forth, W. of Borrowstounness. In France two Avons are in the Loire Basin, and two others are tributaries of the Seine.

Avranches (anc. *Abrincatui*), a town in the department of Manche, Lower Normandy, France, situated on the river Sée not far from the sea. The cathedral is quite modern, the site of the old structure being now an open space with a stone that marks the spot where Henry II. received absolution for the murder of Thomas à Beckett. The church of St. Saturnin has a remarkable gateway. The ancient palace of the bishops now serves as a museum. Lace-making is the principal industry, but there is a large trade in agricultural produce, such as grain, flax, hemp, butter, eggs, and cider.

Awe, Loch, situated in the centre of Argyllshire, Scotland, has a length of 25 miles, with a breadth varying from two and-a-half miles to half-a-mile, being the second in size of the Scottish lakes. It is fed by the Orchy, which drains part of the Moor of Rannoch, and its superfluous waters are discharged by the river Awe into Loch Etive. Many islands stud its surface, and on some of them are interesting ruins. The shores are steep and gloomily picturesque, especially in the pass of Brander, at the W. extremity, and the crest of Ben Cruachan overshadows its waters. It is a favourite resort of fishermen, being full of trout and salmon. The Campbell slogan, "It's a far cry to Lochawe," took its origin hence.

Awn, a bristle-like appendage to the glume, or bract, in some grasses, such as oat, barley, bearded wheat, etc. It springs either from the back or from the apex of the glume, and is believed to correspond structurally to the blade of a leaf. It serves to protect the seed from the depredations of birds, and may in some cases assist in burying it beyond the reach of drought.

Ear of barley (showing awns.)

Axe, an instrument used for hewing timber and chopping wood, and (till the introduction of firearms) as a weapon. The modern axe consists of a *head* of iron edged with steel, and a *helve* or handle. Stone axes, however, are amongst the earliest of human inventions, and are often used by savage tribes. They differ from *celts* (chisels) in being of more complex shape and fitted for hewing. The modern axe differs from the Adze in that its head is fixed in the plane of the sweep of the handle, whereas the head of the adze is fixed transversely to this plane.

Axel, the capital of a canton of the same name in Holland. It is on an island in the Scheldt, 28 miles from Antwerp, and the inhabitants are mainly engaged in agriculture.

Axel, or ecclesiastically Absalon, Archbishop of Lund and Primate of Denmark in the twelfth century, was the trusted counsellor of Waldemar I. and Canute IV., whom he served with the sword as well as with the crozier, freeing the country from pirates and defeating the Pomeranians. He restored Dantzic and enlarged Copenhagen. The famous Saxo Grammaticus was in his service, and has left many memorials of his patron's career. He died in 1201 at the age of 73.

Axholme, or Axeholme (A.S. *aks-holm*, oaks-island), a tract of land in N.W. Lincolnshire, 17 miles long by 5 broad, enclosed by the rivers Trent, Idle, and Don. It was formerly a forest, and then a marsh, but was drained in 1634, settled by Dutch and French Protestant refugees, and is now fertile, producing hemp, flax, rape, and turnip seed. The small towns of Crowle and Epworth are within its limits, the latter being famous as the home of the Wesleys.

Axifera, a family of Alcyonaria, of which the Gorgonias and "Fan Corals" are the best known members. [Gorgonia.]

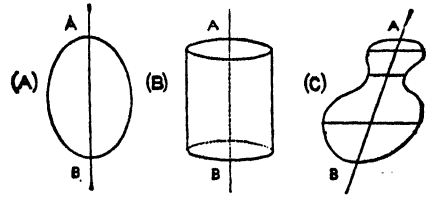
Axil, from the Lat. *axilla*, the armpit, is the angle between a leaf and the stem. In flowering plants there is generally one bud in each axil; but honeysuckle is a plant in which several occur.

Axim, a trading settlement in the fertile district of Ahanta, W. of Cape Three Points, on the Gold Coast, Africa. It belonged to Holland until 1871, when it was ceded to Great Britain together with all the other Dutch possessions on the coast.

Axinomancy (Gk. *axine*, an axe), an ancient method of divination for the detection of crime by means of an axe. In one form the axe was poised on a bar, and the names of suspected persons pronounced. Its movement at any name was taken to be a sign of the guilt of the person named.

Axiom (Gk. *axioō* to claim), a proposition which disputants may fairly expect shall be accepted as an ultimate principle without discussion. In Aristotle's logic the term was applied to the ultimate principles common to all sciences, as, for instance, the Laws of Identity and Contradiction. Now, however, it is specially used in geometry. Some philosophers hold that belief in geometrical axioms is due to the constitution of the mind; others that it is due to experience. In Euclid's system of geometry we have fifteen axioms assumed. Three of these are postulates, *i.e.* problems that experience tells us can be accomplished.

Axis, a term in geometry denoting a line in a plane or solid, about which there is symmetrical



Axis.

disposition of the figure; as A B. In (C) we have an example of an axis of *skew* symmetry (q.v.).

Axis Deer (*Cervus axis*), a native of India, ranging into the islands of the Eastern Archipelago. It closely resembles the Fallow Deer (q.v.) in size and coloration, but differs widely in the form of its antlers, the brow tine being simple, and the beam straight for some distance, and forked nearly at the end. The female is lighter in colour than the male, and has no antlers. These animals are said to be very indolent; they feed only by night and sleep by day, frequenting the heavy grass jungles along the banks of rivers. Their cry is a short shrill bark on the approach of danger. They are very shy and timid, and their sense of smell is so acute that sportsmen find it very difficult to get

within range. The coat of the Axis Deer affords a good example of protective coloration, for it so much resembles the effect of sunlight through foliage that it is almost impossible to detect one of these animals in the woods.

Axminster, a market town of Devonshire, on the river Ax, 24 miles from Exmouth. The minster is said to have been founded by Athelstan to commemorate a victory over the Danes. It is an ancient structure and contains some interesting monuments. The place was celebrated for the manufacture of pile-carpets, and still produces woollen fabrics. Pop. (1901), 2,872.

Axolotl, the larval or tadpole form of salamanders of the genus Amblystoma, which ranges from Canada and Oregon to Mexico. The best known is the larva of *Amblystoma mexicanus*, originally found

AXOLOTL (*Amblystoma mexicanus*).

in the lake which surrounds the city of Mexico, and, under the name *Siredon pisciforme*, made the type of a genus, which of course has now lapsed. When full grown the Axolotl is a stoutly built lizard-like animal, some nine or ten inches long, of a dark slate-colour, covered with black spots. The tail is flattened and has a semi-transparent membranous fin, the head is flat and broad, and carries three feathery gills on each side. In Mexico they are eaten by the natives and esteemed a delicacy. M. Duméril, in 1865, was the first to demonstrate by actual experiment the larval character of this animal; and since then many observers have seen Axolotls develop into Amblystomes. They are frequently kept for this purpose in aquaria in this country, and may be bought of any dealer in aquarium requisites. The Rev. G. C. Bateman says: "The length of time which will elapse before the Axolotl becomes the perfect Amblystome will depend upon circumstances; sometimes it will lose its gills and develop into the air-breathing animal within twelve months, and sometimes it will remain an Axolotl for three or four years." The chief difference between the mature and immature form is that the gills and tail-fin of the latter are absorbed. Both forms lay eggs, some of which may develop into Axolotls and some into Amblystomes. The reason for this is not known, but probably depends upon environment.

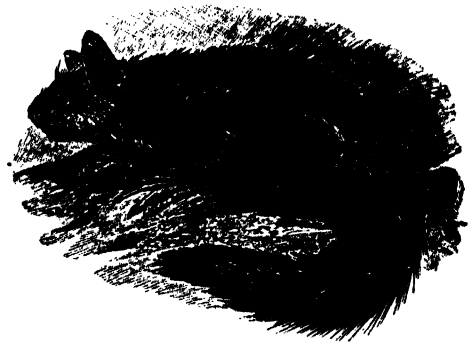
Axum (*Auxumum*), the former capital of the kingdom of Tigré, Abyssinia. It is a very ancient city, and from the fourth century B.C. enjoyed great prosperity under a Greek dynasty. Christianity was introduced in the fourth century A.D. It is now in a state of decay. The church, built in 1657, is regarded as one of the finest in the country and contains a copy of the *Chronicle of Axum*, a record of Abyssinian history. Greek inscriptions have been found here. The city is about 120 miles from the Red Sea and a little to W. of Adowa.

Ay, or AI, a town of France on the river Marne and in the department of that name, about 18 miles from Reims. The neighbouring vineyards produce a famous growth of champagne which is perhaps the oldest and the best of the wines of the district. It is calculated that the Ay vineyards yield in good years 20,000 pieces.

Ayacucho (native *Huamanga*), the capital of the department of the same name in Peru, South America. It was founded by Pizarro, and is a thriving town of 10,000 inhabitants. It was here in 1824 that the Peruvians and Colombians defeated the Spanish and won their independence. The department has an area of 24,213 square miles. Lake Titicaca and the peaks of Illimani and Sorata are within its confines.

Ayala, PEDRO LOPEZ D', a Spanish statesman and soldier born in 1332. He served under Peter the Cruel and his three successors in the monarchy of Castile. At the battle of Najera he fell into the hands of the English and was brought a prisoner to England, where, as he tells us in a poem, *Rimado de Palacio*, he suffered great hardships. He went as ambassador to Charles V. of France and held the office of grand chamberlain and chancellor. Among his works were a translation of Livy and a chronicle of the kings of Castile. He died in 1407.

Aye-aye, the popular name, probably derived from its cry, of *Cheiromys madagascariensis*, the



AYE-AYE (*Cheiromys madagascariensis*).

sole species of a genus of aberrant Lemurs, with affinities to the Rodents. It is a rare nocturnal arboreal animal, about the size of the domestic cat, with a long squirrel-like tail, found only in Madagascar. The eyes are very large, as are the naked ears, which are expanded widely and bent forward; the hair on the body is dense and furry, of a deep

fuscous hue, approaching black, mixed with scattered long white hairs, especially on the back. The feet are long, and the great toe is well developed for grasping; the hands are like those of no other animal, the third digit of each being very thin, and "resembling a piece of bent wire." The Aye-aye passes the day curled up in a kind of nest, but is very active at night. It feeds chiefly on the larvæ of wood-boring insects, using its strong teeth to gnaw away the wood and its wire-like finger to pick them from their holes. It also eats fruit, the pith of the bamboo, and in captivity subsists on bread and milk, with soft fruit, as bananas. It uses the middle finger to carry water to its mouth, and does this so rapidly that the liquid seems to pass in a continual stream, but sometimes the animal laps like a cat. The zoological position of the Aye-aye was long a matter of doubt, and to Sir Richard Owen belongs the credit of satisfactorily determining its place with relation to other animals. The natives have a superstitious dread of it, believing that whoever kills or molests one will die within the year, and this fear, coupled with the nocturnal habits of the animals, makes it very difficult to obtain specimens. There was one in the Zoological Gardens, but its cage appeared to be tenantless, for "Jack" passed the day in the little box at the top, and only came down when the visitors had left the monkey-house. It died about 1896.

Ayesha, the favourite wife of Mohammed the Prophet, was the daughter of Abu-Bekr, the first Caliph. She married at the age of nine, and ardently adopted her husband's religion. Though she bore no children, he was deeply attached to her and died in her arms. After his death she opposed the succession of Ali, became mixed up in the intrigues that ensued, and was for a time kept in honourable captivity. She died in 677 A.D., aged 67, and her memory is highly venerated by the Mussulmans, who style her "The Mother of the Faithful."

Aylesbury, a borough and market town in Buckinghamshire on the London and N. Western, Gt. Western, and Metropolitan Railways, 39 miles from London. The rich vale that surrounds it bears its name. Its antiquity is great, and it is associated in history with the struggles between the Britons and the Saxons, having for some years been the capital of the British kings. The parish church is a handsome Early English structure, and there are good public buildings. Besides doing a large trade in agricultural produce, bone-lace, and straw-plaits, it is famous for ducks, which are reared extensively for the London market. The parliamentary representation is merged in a division of the county. It gives its name to a marquisate, the title of which is generally written Ailesbury. Pop. (1901), 9,244.

Aylesford, a village in Kent on the right bank of the Medway. In the parish is the famous cromlech known as Kit's Coty House, which is supposed to mark the grave of Catigern, the British king, who with his Saxon foe Horsa was killed here in battle. The Earls of Aylesford take their title hence. Pop. (1901), 18,518.

Aylmer, JOHN, born in Norfolk in 1521, was chosen as tutor to Lady Jane Grey and made Archdeacon of Stow, but on Mary's accession had to fly to Zurich. He returned as Archdeacon of Lincoln in Elizabeth's reign, sat in the Synod of London, and was appointed Bishop of London in 1576. He persecuted Papist and Puritan with impartiality, and earned the cordial detestation of the reformers. Spenser satirised him in the *Shepherd's Calendar*. He died in 1594.

Aymaras, the chief indigenous race of Peru and Bolivia, whose original home was Lake Titicaca, cradle of the Peruvian Incas. They appear to be the primitive stock from which sprang the Quichuas, that is, the dominant nation of Peru at the time of the Spanish conquest. Both languages are related, Aymara representing a ruder and more archaic, Quichua a more modern and refined form of a common mother-tongue. The physical type is also the same—short, thickset, robust figures, little over five feet high, small black eyes, somewhat arched nose, short legs, small extremities, coppery complexion, very short round head, but mostly compressed by artificial deformation. The Aymaras were formerly a highly civilised and powerful nation, as is evident from the remains of the stupendous monuments scattered round the shores of Titicaca, and the numerous graves discovered in many districts now entirely uninhabited. The pure Aymara race still numbers about 500,000, and the Mestizos (Hispano-Aymara half-breeds) over 100,000. The latter mostly speak Spanish, the former Aymara, but all are now nominal Christians, retaining many of the old Pagan superstitions under the outward form of the Roman Catholic religion. See Clement Markham's "Tribes of the Empire of the Incas," in *Journal of the Royal Geographical Society*, 1871, and D. Forbes "The Aymara Indians," in the *Journal of the Ethnological Society*, 1870.

Aymon, Duke of Dordogne and Prince of the Ardennes, was one of Charlemagne's vassals and the father of four sons renowned in chivalrous legends, viz. Renaud de Montauban, Guichard, Alard, and Richardet. The elder is immortalised in the *Orlando Furioso* of Ariosto, and their story is also told by Froissart. There exists also a curious French romance, *L'Histoire des quatre fils d'Aymon*, attributed to Hugo de Villeneuve, a troubadour of the thirteenth century, which was translated and reprinted by Caxton.

Ayr, a county on the W. coast of Scotland, having an area of 1,149 square miles, and returning two members to Parliament. The island of Ailsa is included in the county of Ayr. The surface is hilly, but the soil is fairly productive, and iron, copper, lead, graphite, antimony, coal, freestones, and valuable pebbles abound. There are several small rivers, and some inland lakes, the largest being Loch Doon. The trade in iron and chemicals is considerable, and factories exist for woollen and cotton fabrics, thread and muslins. The chief towns are Ayr, Kilmarnock, Maybole, and Ardrossan. Burns, the poet, was born at Alloway in this county. Pop. (1901), 254,468. Ayr (Erigena), the capital, stands at the mouth of the river of the

same name, 40 miles by railway from Glasgow. It is a well-built town connected by two bridges with the suburbs of Newton and Wallace Town, on the right bank of the river. Wallace's Tower in the High Street occupies the site of an older building where he is reported to have had his quarters. The chief industries are shipbuilding, carpet-weaving, iron-founding, and machine-making. The harbour is good and a brisk shipping trade is carried on. For purposes of parliamentary representation it is grouped with four other burghs. Pop. (1901), 28,624.

Ayrer, JACOB, a German writer who began life at Nuremberg as a dealer in iron, but afterwards took successfully to the law. It was, however, as a dramatist that he became known to posterity. He wrote thirty-six plays in the style of his contemporary Hans Sachs, some of them being of high merit for their vigour and spirit, though rough and irregular in form. It has been suggested that he borrowed from Shakespeare, but as his works were published posthumously in 1618, this view can hardly be correct.

Ayton, or AYTOUN, SIR ROBERT, was born in Fifeshire in 1570, being of a good old family. After graduating at St. Andrew's he went into France and got a thorough knowledge of the language. A landatory poem on the accession of James I. procured him employment at Court, which he retained till his death in 1638. His verses in Latin, Greek, French, and Scotch were esteemed in their day, and it is said that Burns received the suggestion of *Auld Lang Syne* from one of his lyrics.

Aytoun, WILLIAM EDMONSTOUNE, was born at Edinburgh in 1813 and was educated for the bar. He preferred, however, the career of letters, and was in 1845 appointed to the chair of rhetoric and literature in the University of Edinburgh. Under the name of Augustus Dunshunner he wrote many

AZALEA.

lively sketches in *Blackwood's Magazine*, and married a daughter of the editor, Professor Wilson, whom he ultimately succeeded. His *Lays of the Scottish Cavaliers* are spirited productions in the ballad style, and among his serious poems *Poland* and *Bothwell* deserve praise. He wrote in conjunction with Sir Theodore Martin the *Bon Gaultier Ballads*, and in *Firmilian* satirised the dramatists of the Joanna Baillie School. His *Ballads of Scotland* contain some of the best lyrics of the north. *Norman Sinclair* was his only attempt to write a conventional novel. He died in 1865.

Azalea, a genus including about twenty shrubs belonging to the heath tribe, natives of North America and Asia, largely cultivated for their fragrant flowers. Their leaves are fringed with hairs, have a glandular point and are deciduous: the flowers are in umbellate clusters, are glutinous outside and have five united sepals, a funnel-shaped corolla of five spreading petals, five long stamens with anthers opening by pores, and a five-chambered ovary with many ovules and a single style. *A. pontica* of Asia Minor produces the narcotic honey eaten by Xenophon's army.

Azazel, a word occurring only in Leviticus xvi., where it is translated "scape-goat," with "Azazel" in the margin of the Authorised Version, and "dismissal" in that of the Revised Version. From the context it is plain that the word cannot be translated "scape-goat." From the opposition between Azazel and "the Lord" (Jahveh), Ewald considers the former to be a relic of a pre-Mosaic religion, though not to be confounded with Satan. [SCAPEGOAT.]

Azeglio, MASSIMO TAPARELLI, MARCHESE D', an Italian statesman, was born of a noble Piedmontese family in 1798. He first attracted notice and appealed to patriotism as a painter of historical pictures. Next he spoke to his fellow-countrymen in the stirring romances *Ettore Fieramosca* and *Nicolo de Lapi*. Lastly in 1846 he published a political pamphlet which revealed him as an advocate of reform. He is believed to have had a good influence over the early days of Pio IX., but in 1848 he laid aside the pen for the sword, and fighting for Italian independence was seriously wounded at Vicenza. He now entered the Piedmontese parliament, and after Novara became Victor Emanuel's right-hand man. Strongly attached to constitutional monarchy and opposed to republican innovations, he paved the way for the bolder policy of Cavour, retiring in his favour from the head of affairs. He represented his country for some years at the British Court, and won many firm friends in England. He died in 1866.

Azerbijan, or ADERBEITZAN (anc. *Atropatene*), a province of Armenian Persia comprised within the old limits of Media. It lies S. of the river Aras, and is cut off by a narrow strip of Russian territory from the Caspian. Its area is 25,280 square miles, and its population about two millions. The surface is very mountainous—the peak of Savalany attaining over 12,000 feet, but the plains are very fertile. Numbers of cattle, sheep, and horses are bred and reared. There is also great mineral wealth of which but trifling use is made, and naphtha is abundant. Leather-dressing is the chief industry, but velvets, carpets, woollen fabrics, and cutlery are manufactured. The great salt lake of Urumiyah occupies a large space to the west and receives

several considerable rivers. Tabruz, the capital, is situated almost in the centre, to the N. of the Sahund mountains.

Azergue, or AZREK BAR EL. [BLUE NILE.]

Azimgahr, a district and city in the Benares division of British India, under the rule of the lieutenant-governor of the North-West Provinces. The area of the district is 2,147 square miles. The soil is fertile and highly cultivated, producing large crops of rice, sugar, and indigo. Cotton and silk are manufactured. The Gogra gives water communication with Bengal. The city, which is about 80 miles N.E. of Benares, stands on the Tons river, a tributary of the Ganges. It was founded in 1665 by a local landowner.

Azimuth of a heavenly body, the arc of the horizon intercepted between a circle passing through the centre of the body and the zenith (q.v.), and the meridian of a place.

Azoic, without life, a term sometimes applied to the Archæan rocks as containing no fossils, or none at least certainly recognisable.

Azores, or AÇORES, or WESTERN ISLANDS, form a group of nine in the Atlantic (lat. 37° 30′ N., long. 26° 0′ W.). St. Michael and St. Mary are the most easterly; Terceira, Graciosa, St. George, Pico, and Fayal lie clustered together; whilst far west are the two islets of Corvo and Flores. All are of volcanic origin and are subject to earthquakes. In 1591 St. Michael's had a severe visitation, and great upheavals occurred in 1808 and 1811. Numerous hot springs are found. Discovered in the 15th century and colonised by Portugal with Flemings, they owe their name to the hawks (Port. *açor*) that haunted them. The Spaniards held them from 1580 to 1640, since which date they have belonged to Portugal. Their area is about 966 square miles. The soil is very fertile and bears heavy crops of wheat, maize, sugar, fruits, tobacco, and wine. The principal produce, however, consists of oranges and lemons exported to the English markets. St. Michael's and Fayal have the best harbours. Ponte Delgada, on St. Michael's, is the trade centre; Angra, on Terceira, is the seat of government, and Horta, on Fayal, is a thriving place.

Azotised Bodies. [NITROGENOUS BODIES.]

Azotus. [ASHDOD.]

Azov, or AZOFF, SEA OF (classic *Palus Mæotis*), an inlet formed by the Crimean Peninsula, South Russia, and communicating with the Black Sea by the Straits of Yenikale. Its length from N.E. to S.W. is about 235 miles, and its greatest breadth 110 miles. The mean depth is only 35 to 40 feet. It receives the waters of the Don and the Kouban. Large exports of corn, timber, and other produce are made from Taganrog and Kertch, the two chief ports. Fish are so plentiful that the Turks call the Gulf *Baluk-Denis* or Fish Sea. In May, 1855, it was occupied by the French and English fleets.

Azov, the town from which the sea gets its name, is situated on the river Don about 20 miles from its mouth. It was founded by the Genoese in the 12th century on the supposed site of the Greek colony of Tanais. It has only belonged to Russia since 1774. Once a place of considerable trade, it has sunk into insignificance chiefly because of the silting up of the harbour. The fortifications destroyed by the allies during the Crimean war have only been partially restored.

Azrael, in Rabbinical and Mohammedan tradition, was the Angel of Death, to whom was entrusted the duty of watching over the dying and setting free the soul from the body. He will die himself last of all at the second trump of the Archangel.

Aztecs, the civilised inhabitants of the Mexican plateau, whose empire was overthrown by the Spaniards in 1520. They appear to have reached the plateau after long migrations from the north some three or four centuries before the conquest;

HEAD OF AZTEC.

but they had been preceded by other civilised peoples of the same race, the earliest of whom were the so-called Toltecs, that is, "Builders," to whom all the older Mexican monuments are commonly attributed. At the time of the discovery the Aztecs occupied not only the Anahuac plateau, but also numerous detached settlements as far south as Lake Nicaragua, and the Aztec language has been traced from this point northwards to Oregon. It is a typical American tongue, in which the polysynthetic principle is carried to its utmost limits, all the words of the sentence tending to become "incapsulated," or incorporated in a single polysyllable. It is still current in a great part of Mexico from Oajaca as far north as Durango and Sinaloa. Its nearest affinities are with the Cora of Jalisco, the Tarahumara of Chihuahua, the Acajé of Durango, the Cahita, Tepehuana, Pima and Opata of Sonora and Sinaloa. The oldest and most comprehensive name of this group is *Nahua*, whence the terms Nahuatlac and Nahuatl often applied respectively to the Aztec nation and Aztec language. The Aztecs are of small size, averaging about 5 ft. 2in., with dark or reddish-brown skin, very long black hair, small black eyes slightly oblique, curved nose, large mouth and ears, thin lips, broad features. They possess great staying power, are extremely frugal and patient under harsh treatment, silent, moody,

and impassive. They still number about 1,600,000 of pure blood, besides numerous half-breeds. See H. H. Bancroft, *The Native Races of the Pacific States*.

Azun, VAL D', a charming valley called "The Eden of the Pyrenees." It opens out of the valley of Argelès and leads up to the Pic du Midi.

Azuni, DOMENICO ALBERTO, an Italian jurist and antiquary, born in the Island of Sardinia in 1749. Before the Revolution he was a Senator at Nice, and was subsequently called to Paris to assist in codifying commercial laws. In 1807 he was judge of the appeal court at Genoa, and finally returned to Cagliari as judge and as director of the library of the University. He wrote several legal works as well as an exhaustive description of his native island. He died in 1827.

Azurine (*Leuciscus cæruleus*), a pseudo species of freshwater fish, founded by Yarrell on abnormally coloured specimens of the Rudd (q.v.) sent him from Knowesley, Lancashire.

Azurite ($2CuCO_3 + CuH_2O_2$), or CHESSYLITE, blue carbonate of copper, is related in composition to malachite, the green carbonate, with which it is commonly associated. It takes its names from its deep azure blue colour and from Chessy, near Lyons, where it occurs. When in sufficient quantity it is a valuable ore.

Azygos, the term applied to any unpaired part.

Azymites, from Gr. *Azyma*, "the unleavened bread" of the Jewish Passover, a term applied by Greek Christians to those who followed the practice of the Latin Church in using unleavened bread in the Eucharist. The controversy between the Prozymites or Fermentarians and the Azymites waxed hot in the eleventh century, but the Romish Church still adheres to the use of an unleavened wafer.

B

B, the second letter in the English alphabet and in most other alphabets. It is a labial and a mute. In *music* it is the seventh tone of the scale of C. For the various meanings of B as an abbreviation, *see* ABBREVIATIONS.

Baader, FRANCIS XAVIER, born at Munich 1765, and distinguished as a student of theology and philosophy in the university there, was taken under the protection of Ludwig I. of Bavaria, who desired through his agency to counteract the prevailing Pantheism of Germany. Baader wrote a great deal of controversial matter, chiefly in pamphlet form, on the Theory of Redemption, the Relation of the Intellectual to the Moral Faculties, and kindred topics. His speculations are tinged with mysticism, but his belief in liberty led him, in 1815, to advocate the restoration of Poland, little to the satisfaction of his royal patron. He died in 1841.

Baal, BEL, BELUS; plu., BAALIM (*lord, master*), the name of one of the most widely venerated gods of the East, whose worship appears to have extended also amongst the primitive Keltic nations of Europe. This special form of idolatry must have grown up in Phœnicia, Chaldæa, and Assyria, but it was only another aspect of that natural religion which marks everywhere the early history of mankind. Baal seems to have represented the sun (2 Kings xxiii. 11), as Ashtaroth did the moon, though later on the more abstract notion of divinity was probably attached to the word. Thus we find Baal-peor (*lord of the dead*), Baal-berith (*lord of the covenant*), Beel-zebub (*lord of flies*), and Baal is even a feminine appellation, not only in the Septuagint, but in Rom. xi. 4. It forms an element in many names of places and persons, as Baalbec, Babylon, Baal-zephron, Hannibal (*grace of Baal*), and possibly may be traced in our Billingsgate (*Belin's gate*). The rites of this deity were always connected with the use of fire, and occasionally with human sacrifices (Jerem. xix. 5) and unclean orgies. His altars were on high places or pyramidical structures (*Babel*) and surrounded by groves. He was represented by a human head with the horns and ears of a bull, and with stars surrounding it. The Hebrews borrowed this idolatry very early from the Canaanites, and under several kings, Manasseh especially, Baal's worship superseded that of Jehovah, and the description of the discomfiture of his priests by Elijah in the reign of Ahab (1 Kings xviii.) gives a vivid picture of the pagan ritual. As Belus he was introduced into classical mythology, and identified sometimes with the father of the Assyrian Ninus, sometimes with Jupiter or Saturn, sometimes with the Eastern conception of Hercules. Among the early Britons his cult appears to have been mixed up with Druidism. Beal has left traces among the Irish Kelts, and Bel-tane, a spring festival, was observed until recent times with curious heathen ceremonies in the north of England and the lowlands of Scotland.

BAAL.

Baalbec, or BAALBEK (*city of the sun* or *of Baal*, Gk., *Heliopolis*), an ancient city of Syria, situated in a fertile valley at the foot of Anti-Libanus, about 4,500 feet above sea level, 35 miles N.N.W. of Damascus. Being on the route from Tyre to Palmyra, it acquired in very remote times vast wealth and splendour, but is not mentioned by name in the Bible, or in any author earlier than Josephus. The city was made a colony of Rome under Julius Cæsar, and was occupied by a garrison under Augustus. In the first three centuries of Christianity it was the scene of fierce opposition to the new faith. The Moslems captured it after a severe struggle in 638, and the Caliph of Damascus in 748 A.D. sacked and dismantled it, inflicting a heavy blow on its prosperity. In the 11th century

the Seljukian dynasty were masters here till dispossessed by Genghis Khan, and in 1145 it was again subject to Damascus. Earthquakes inflicted much damage in the 12th century, and in 1400 it was pillaged by Timur, and afterwards became incorporated in the Turkish empire. The old walls, four miles in circumference, can still be traced; but the present population is housed in a miserable collection of huts. The Great Temple of Baal is one of the most magnificent ruins of the East, standing on a lofty artificial platform, and covering an area of some four acres. The temple itself, with its peristyle of fifty-four columns 62 feet high, measured at least 250 feet in length and 140 in breadth. Not far from this majestic structure stands the Temple of the Sun, exceeding in size and proportions the Parthenon at Athens. The Circular Temple is comparatively small, but is a finished specimen of architecture. These ruins have not yet been fully explored. Two mosques of a much later date, and the traces of Saracenic fortifications deserve notice.

Baba, CAPE, at the southern extremity of the Turkish province of Bigha, in Asia Minor (lat. 39° 28′ N., long. 26° 4′ E.), at the entrance to the Gulf of Adramyti. The small town of Baba Kalessi is in its immediate vicinity.

Bâbar, (1) a large Afghan tribe, akin to the Shirâni, in the Koh-i-Daman, Dera Ishmail district, opposite the Sangao and Dahina passes; two main divisions: Mahsûd with seven Khels, Ghwara with five Khels; 4,000 families. (2) A branch of the Khatak Afghans, left bank of the Indus near the Sohân river. The term Bâbar, Bâbor, which is the *Babhrava* of Sanskrit records, is widespread throughout north-west India, as amongst the Jâts of Sindh and the Babrias (Bâbars) of Gujerât.

Babbage, CHARLES, born at Teignmouth in 1792, graduated in 1814 at Trinity College, Cambridge, without honours. He had, however, devoted himself to higher mathematics, and in conjunction with Herschel and Peacock, strove to substitute the Leibnitzian for the Newtonian notation in the Calculus. With the object of eliminating inaccuracies in astronomical and other calculations, he started the idea of a calculating machine, and was aided by the British Government in prosecuting his designs, which occupied nearly all his life, but were productive of no great practical success. From 1828 to 1839 he was Lucasian Professor at Cambridge. His later years were spent in London, where he constructed several machines capable of yielding certain results, helped to found the Astronomical and Statistical Societies, and waged incessant war with street musicians. He died in 1871.

Babblers (*Timaliinæ*), a sub-family of Babbling Thrushes (q.v.), most numerous in the Malay Peninsula, whence they range north, south, and east in decreasing numbers. In this sub-family, which includes the Bower-Birds, Bush-Babblers, and Regent Bird, the rounded concave wing characteristic of the Babbling Thrushes reaches its fullest development.

Babbling Thrushes (*Timaliidæ*), a family of passerine birds, characteristic of and abounding in the Oriental region, occurring less plentifully in Australia and Africa. They are small, short-tailed, strong-legged, active birds, mostly of sombre plumage, and are distinguished from the True Thrushes by their rounded concave wings, which fit close to the body. [THRUSH.]

Babel (*gate of God*), the early and local name of Babylon (q.v.), the foundation of which is assigned in Genesis (x. 10) to Nimrod, about 2,000 years before the Christian era. The tradition as to the building of the tower and the confusion of tongues, recorded in Genesis xi. 1–9, may have connected itself with the name, owing to its resemblance to the Hebrew *balbel* (confusion). The same story recurs in the primitive history of many races, and is preserved as regards Babylon in the cuneiform inscriptions. The famous tower, which the builders intended to carry up to heaven, is identified by Strabo with the tomb of Belus, and he fixes the height without apparent authority at 606 ft. It is more probable that we have a trace of the structure in Birs Nimroud, the ruins of which still exist at Borsippa, a suburb of Babylon. This temple, which was according to legend completed by Nebuchadnezzar, after many previous kings had been engaged in building it, is a pyramidical structure of eight storeys, and over 200 ft. in height. If this be the building seen by Herodotus, the city walls must in his time have embraced an enormous area.

Bab-el-Mandeb, STRAITS OF (Arabic *gate of tears*), the channel which connects the Red Sea with the Indian Ocean, thus dividing Arabia from Africa, has a mean breadth of 20 miles. The island of Perim, occupied by Great Britain, divides it into the Great Strait to the W., and the Little Strait to the E. The latter, though narrow, is less deep and subject to fewer currents, and is therefore used by most vessels passing in and out of the Red Sea.

Baber, or BABUR (Arabic *tiger*), the name by which the founder of the Mogul dynasty in India is best known. Born in 1483, he succeeded his father, Omar Sheikh, a descendant of Timur, in 1495, as sovereign of the district between Samarkand and the Indus. A rebellion drove him out of his kingdom, but in 1504 he collected a force, took Cabul, subjugated Kashgar and Kandahar, and thrice invaded India. At the great battle of Paniput (1526) he defeated and slew Ibrahim, Sultan of Delhi, and next became master of Agra. A year later he crushed Rana Sunga of Mewar, and all India fell virtually under his rule. He died in 1530, but his dynasty lasted for three centuries. His memoirs, written by himself, are extant.

Babeuf, FRANÇOIS NOEL, born at St. Quentin, France, 1764, and brought up as a surveyor, embraced revolutionary principles in their wildest form, and calling himself Gracchus, edited a paper entitled *Le Tribun du Peuple*. In this he advocated the nationalisation of land and socialistic theories generally, inveighing against the Directory. His followers, the *Babouvistes*, formed a club in

which equality was the rule. He was charged at Vendôme with conspiring to overthrow the constitution, attempted to commit suicide, but was brought alive beneath the knife of the guillotine in 1797.

Babington, ANTONY, an English Catholic of good Derbyshire family, was a page at Sheffield when Mary Queen of Scots was there under charge of Lord Shrewsbury. He at once came under her fatal spell (1569). Being in favour at Court, he served as the tool of the Jesuit Ballard in hatching a conspiracy for the murder of Elizabeth. His correspondence in cipher with Mary and others was intercepted by Walsingham. He was arrested, confessed his guilt, and suffered death with thirteen confederates at Tyburn in 1586.

Babirusa, BABIROUSSA (*Sus babirusa*), the wild pig of Celebes and some of the adjacent

BABIRUSA (*Sus babirusa*).

islands. The native name, which has been adopted into English, signifies "Pig-deer," and refers to the abnormal tusks of the male, which, from their position, give the animal the appearance of being horned. The animal resembles a large hog in general appearance, but is more slightly built, has longer legs, and is nearly hairless. It does not root with its snout like other pigs, but feeds on fallen fruit and maize. The lower tusks are very long and sharp, and form terrible weapons; those of the upper jaw grow upwards, and curve backwards towards the top of the head. Dr. Bland Sutton, the pathologist to the Zoological Society, records the case of an animal that died in the gardens, and says that its upper canines were so long that they would have penetrated the skull if they had not been repeatedly cut. It was formerly supposed these extraordinary teeth served as hooks by which the animal could rest its head on a branch. Then it was suggested that they served to guard the eyes from thorns and spines while the babirusa was hunting for fallen fruits among the tangled thickets of spiny plants. This suggestion does not meet the case, for the female, who procures her food in the same way, does not possess such teeth. Dr. A. R. Wallace believes that they were once useful, and were then worn down as fast as they grew, but that changed conditions of life have rendered them unnecessary, and they now develop into a monstrous form, just as the incisors of rodents—which they resemble in springing from persistent pulps—will go on growing if the opposite teeth do not wear them away.

Bâbis (Per. *bâb-ed-Din*, gate of the faith), a modern Persian sect founded in 1843 by Mirza Ali Mohammed of Shiraz, who took the title of Bâb. Their theology is a mixture of Pantheism with Gnostic and Buddhist doctrines, and they are adverse to asceticism, polygamy, divorce, and the subjection of women. They tried to raise a revolution in Persia in 1848, and three of their members attempted to assassinate the Shah in 1852. Both attempts failed and were followed by terrible persecution. Their doctrines are a development of SUFISM (q.v.).

Baboo (Hindustani *Babu*, a title of respect, like Mr.), a term commonly applied to a native of India (especially Bengal) who has received some English education. "Baboo English," produced by the unintentional misuse by such natives of terms and phrases derived from English literature (the more grandiloquent the better), is well known, and specimens may often be found in the native portion of the Anglo-Indian Press.

Baboon, the popular name for any monkey of the Old World genus Cynocephalus, of the subfamily Cynopithecinæ, the species of which are mostly African, though some range into Arabia, and one (*C. niger*) as far eastward as Celebes. The muzzle is very long, and swollen by an enlargement of the maxillary bone; the last lower molar has five tubercles, and the nostrils are always at the extremity of the snout (except in *C. gelada* and *C. obscurus*, which are on that account sometimes made a separate genus, Theropithecus). Baboons have large cheek-pouches, and callosities, sometimes vividly coloured, on their haunches, and may

BABOON (*Cynocephalus papio*).

be readily distinguished by their stout build, dog-like head, large canine teeth, the curious fulness on each side of the long nose, and their habit of

squatting on their hind-quarters like a dog. The tail curves upward from the root and then droops, but when the animal is excited it sticks out and is flourished furiously. When young they make amusing pets, for then they are full of vivacity and fun, but as they grow older they become irritable and fierce, and many keepers in menageries and zoological gardens can testify from painful experience how savagely these animals can bite. Although the baboons approach man more closely than do the anthropoid apes (q.v.) in the double curvature of the spinal column, in other particulars they exhibit greater affinities with the Carnivora, as in their mode of progression, which is essentially quadrupedal, and in the arrangement of bones and muscles necessary to this end. Their food is chiefly fruit, seeds, and young shoots, varied with insects, worms, and, in the case of at least one species, scorpions. Some forms are known to be polygamous, and several males, with their females, live in a kind of social fashion; and nearly all form large troops or bands for foraging or defence. The number of species is probably twelve, nine or ten of which are well-marked. The Common Baboon (*C. papio*), ranging widely over Africa, is a large animal of yellowish-brown colour, slightly shaded with sandy or light-red. It is often seen in menageries, and is the constant companion of Egyptian jugglers, by whom it is taught many amusing tricks. *C. hamadryas* is the Sacred Baboon, formerly worshipped in Egypt as the type of the god of letters, and frequently occurring in their sacred and sepulchral sculptures. It is about four feet high when erect, the face dirty flesh-colour, the rest of the body dusky brown. In the males there is a long shaggy mane, reaching back as far as the loins, which gives these animals the appearance of exaggerated French poodles. The Sphinx, or Guinea Baboon (*C. sphinx*), from Senegal, is covered with long shaggy hair of a deep russet-brown, each hair being marked with rusty-brown and black rings. The slender tapering face, ears, hands and feet, and callosities are black. The Anubis Baboon (*C. anubis*) is a native of the west coast of Africa. The most noticeable points are the very elongated black face and the uniform dark olive-green fur, traversed below the surface with rings of yellow and black. One was purchased for the Zoological Society of London in 1860, and the owner, who had brought it from Lagos, told the secretary that "it is very seldom that these animals can be obtained, the natives having a fearful horror of their strength and ferocity when attacked." Other species are the Black Baboon, Chacma, Drill, Gelada, and Mandrill (q.v.).

Babrius, or BABRIAS, or GABRIAS, a Greek writer of fables, whose history and date are unknown. The best authorities refer him to the third century of our era. Until 1843 a few fragments only in Suidas preserved his name, but in that year a manuscript was found in a monastery on Mount Athos, containing 123 of his fables, evidently based on those of Æsop, unless he preceded the latter in date. In 1859, 95 more were produced, but the authenticity of this last batch is doubtful. Both sets were edited by Sir G. C. Lewis, and their alleged discoverer was a Greek named Mynas.

Babylonia. *Geography.*—The ancient kingdom of Babylonia was bounded on the E. by Elam or Susiana; on the S. by the Persian Gulf; on the W. by the deserts of Arabia; and on the N by Assyria. It was watered by two streams, the Tigris and the Euphrates, and it was intersected by a number of canals, branching out from these great rivers, and dug in order to save the country from the effects of the annual inundations. The last work of the life of Alexander the Great was to superintend the clearing out of some of these canals in the neighbourhood of Babylon, and to form new ones, thus continuing the labours of the ancient

MAP OF BABYLONIA.

native sovereigns. The fertility of Babylonia was so astonishing that Herodotus could scarcely venture to describe it for fear of exciting incredulity. After the conquest of Cyrus, this province was considered the richest of the Persian satrapies. Every kind of cereal yielded abundant crops, and the date-palm of the country, which furnished food, wine, building material and fuel, was celebrated in ancient as in modern times. The more southern districts, however, towards the sea, were marshy, and covered with extensive beds of reeds, which were only partly reclaimed and utilised. There was a large manufacture of baskets, mats, and other articles from these reeds. The greater part of Babylonia is an alluvial plain, and the absence of stone and timber, added to the abundance of fine clay, forced the inhabitants to build of brick, while the presence of springs of bitumen at Hit, the Is of Herodotus, and other places, induced them to use this substance for mortar (Genesis xi. 3); the palm indeed was employed for roofing with a plaster of mud, and for pillars to support small houses, but for other purposes timber had to be procured with vast labour and expense from the mountain ranges

of Armenia, and even from the Syrian Lebanon. Besides bitumen, gypsum is found, and was sometimes used as cement. The domestic animals of Babylonia are camels, horses, sheep, buffaloes, oxen, all of superior breed. Among wild animals the lion was not uncommon, and is still sometimes to be seen roaming near the ruins of Babylon. The country is subject to sudden and terrific hurricanes, dangerous to life; the hot winds are also destructive. The climate is exceedingly sultry from April to October, so that the inhabitants of modern Bagdad often live during those months in partly underground rooms called *sirdâbs*, protected from the heat by exceedingly thick walls. Ancient Babylonia contained a great number of large cities, and the capital itself, Babylon, on the Euphrates, was, if we are to believe the accounts of Greek writers, the greatest city of antiquity. According to Ctesias, who is here more moderate than others, the city was 360 stades, or 40 miles in circumference, a wall of immense height and thickness surrounding it.

Recent Discoveries.—The name of Babylon has never been lost. Classical writers spoke of Babylon when they meant Seleucia or Ctesiphon, and mediæval travellers generally give this name to the city of Bagdad, but the Arabian geographers mention *Ard Babil*, or the district of Babylon, as adjacent to the Euphrates in the neighbourhood of Hillah; and the most northern of the artificial mounds opposite the last-mentioned town has always been called the Mound of Babil. Nevertheless the exact site of the great city was a matter of dispute until Rich, who was also the first traveller carefully to examine the remains of Nineveh [ASSYRIA], published his celebrated *Memoir on the Ruins of Babylon* in 1812. Among the travellers who had visited the mounds near Hillah before Rich, and recognised them as marking the site of Babylon, were Pietro della Valle (1616), Padre Vincenzo Maria di Sa. Caterina da Siena (1657), Otter (1734), Père Emmanuel de St. Albert (1750), Niebuhr (1765), and the Abbé Beauchamp (1782). Many other intelligent travellers had visited Bagdad and its neighbourhood, but owing to the dangers and difficulties attending the enterprise few actually saw these ancient mounds; hence the long continued errors which placed Babylon on the site of Bagdad itself, or at Akkerkuf. Since Rich's inspection the mounds of Babylon, which consist of three great piles of brickwork covered by a layer of mould, and known respectively as *Tell Babil* (or *Mujelibeh*), *El-Kasr* (also called *Mujelibeh*), and *Tell Amran*, besides several long ridges of similar formation, and the *Birs Nimroud*, the remains of a colossal tower in stages on the western bank of the Euphrates, have been examined by Sir Robert Ker Porter (1820), Buckingham (1821), Sir Henry Layard (1848), Sir Henry Rawlinson (1854), M. Oppert (1851). It appears probable that *Babil* represents the great temple of Bel described by Herodotus, that the *Kasr* was, as its name implies, the royal palace, and that the *Birs Nimroud*, which is six miles S.W. of Hillah, was not a part of Babylon proper, but was the famous Temple of *E-zida*, standing in the neighbouring town or suburb of Borsippa. No extensive excavations have been made at Babylon, though various antiquities have been brought thence to England, but other sites in Babylonia have been more or less completely excavated, such as Mukeyyer, where Ur of the Chaldees formerly stood; Abu Shahrein, the ancient Eridu; Warka, or Erech; Senkereh, or Larsa; Abu Habbah, or Sepharvaim; Tell-Ibrahim, the ancient Cutha; and, above all, Tello, the capital of Gudea in remote ages. From the last-named site M. de Sarzec brought a collection of antiquities that illustrate the earliest art and culture of Chaldæa, and are unrivalled in point of antiquity. At Abu Habbah Mr. G. Smith and others obtained an immense collection of Babylonian clay tablets, inscribed with commercial and legal texts. Most of these sites have yielded bricks stamped with inscriptions of ancient kings, but no name has been found so frequently as that of Nebuchadnezzar, whose bricks have been drawn by thousands from the ruins of Babylon, and employed in building modern houses; while many of them have found their way to the museums of Europe, the first that reached England being procured by order of the East India Company in 1800. Historical cylinders containing the annals of Nebuchadnezzar, Neriglissar, Nabonidus, Cyrus, and even Antiochus, have been found in Babylonia. A number of Babylonian boundary-stones have also been discovered, the first of which was procured by Michaux in 1790, a day's journey below Bagdad, and is now at the Louvre.

History.—The earliest inhabitants of Babylonia are generally thought to have been a non-Semitic people, speaking an agglutinative language, known as the Accadian or Sumerian; accordingly the most ancient inscriptions known to us are in the Accadian language alone, such as those of Ur-Nina, Entena, Gudea, and other rulers of Lagash, the modern Tello. Very early, however, a Semitic invasion must have taken place, for the date of two Semitic kings, namely, Sargon and Naram-Sin, is placed, according to the testimony of the later Babylonians themselves, at about B.C. 3800 and 3750 respectively. Whether Gudea lived before this date or not must remain an open question; some would place him as late as B.C. 2500. According to Berosus, a Babylonian priest of Bel, who wrote a history of his own country in Greek for King Antiochus Soter (B.C. 280), a long series of half-mythical kings of Babylonia, including Xisuthrus, in whose time the Flood came, was followed by a dynasty of eight Median kings; among these we must perhaps reckon Kudur-nankhundi, Kudur-mapuk and Arad-Sin (or Eri-aku) of whom we possess monuments, the last king being identified by some with Arioch of Ellasar (Genesis xiv.), and his date fixed about B.C. 2300. About B.C. 2200 Hammurabi sat upon the throne of Babylon, the name of which now first appears in cuneiform records, although it may have been founded centuries before (Genesis xi.). But after him we know little of the history until Burnaburyas, 700 years later, whose letters to Amenophis IV. of Egypt we possess. About 1200 B.C. Babylonia was conquered by Assyria, and, though she soon regained her independence and was again ruled by native kings, she

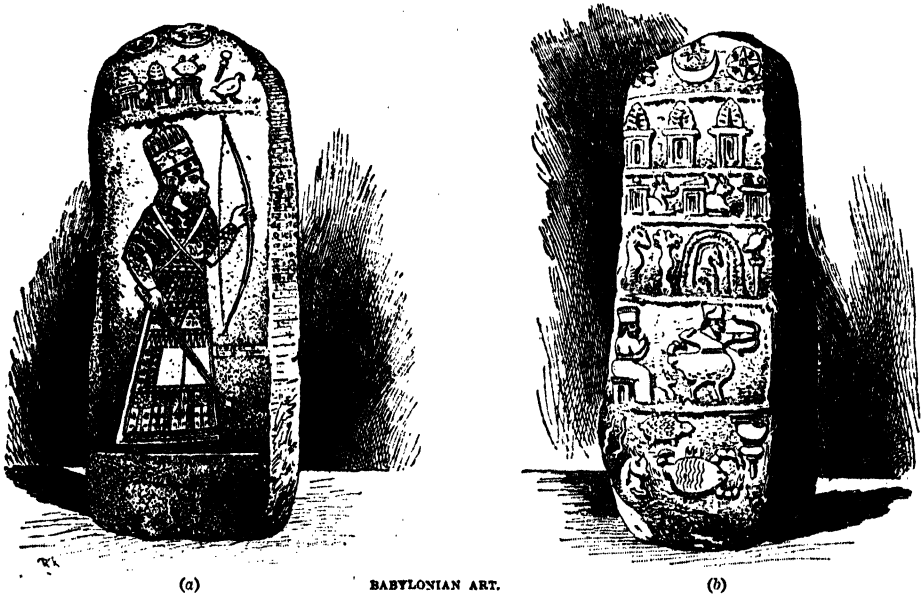
remained a politically subordinate power, and was repeatedly conquered by her more powerful neighbour, until the fall of Nineveh. In B.C. 747 Nabonassar, whose accession formed the era by which all subsequent astronomers dated their observations, came to the throne. His successor, Marduk-apal-iddina is well known to us as the Merodach-Baladan who sent an embassy to Hezekiah, king of Judah; he was subdued by his mighty contemporary Sennacherib, who added Babylonia to his possessions. In 700, however, it again became independent, to be conquered again by Esarhaddon in 680. Esarhaddon bequeathed Assyria to his son Ashur-bani-pal, and Babylonia to his son Shamash-shum-ukin, who, however, was conquered by his brother in 648, when the Babylonians became once more subject to their northern neighbours. About B.C. 609 a change came; the Medes and Babylonians united their forces, besieged Nineveh, and after a long siege took and utterly destroyed it. Nabopolassar, king of Babylon, thus acquired a large portion of the Assyrian possessions, and founded what is called the New Babylonian Empire. He and his son Nebuchadnezzar (B.C. 604–562) did much to enlarge and beautify the city of Babylon; the latter king is, of course, well-known to us as the conqueror of the Jews, and seems to have carried on wars against the Arabs and Egyptians. Nebuchadnezzar is also said to have raised the walls of the capital to a height of at least 75 feet, to have constructed the famous Hanging Gardens for his Median wife, and to have built a great embankment along the river Euphrates. This great monarch was succeeded by his son Evil-Merodach, who was overthrown after a lawless reign of two years by his sister's husband Neriglissar. In B.C. 555 Neriglissar died and left the kingdom to his son Lâbashi-Marduk (in Greek *Laborosoarchodos* or *Labasardochos*), who, though a mere child, showed signs of a bad disposition, and was assassinated after a few months by a band of conspirators, one of whom, Nabonidus, was made king. He reigned for seventeen years, and was active in restoring temples, and in repairing the walls of his city; towards the end of his reign, however, he seems to have left the government in the hands of his son Bel-shar-usur (Belshazzar). In B.C. 538 Babylon was taken by Cyrus, king of Persia, and remained under the power of Persia, although in the time of Darius Hystaspis an attempt was made to throw off the yoke, which resulted in the second Persian capture of Babylon and in the partial destruction of its walls. Further injury was done to the city by Xerxes, who violated and destroyed the temples, not excepting the great temple of Bel. The Persian kings, however, continued to look upon the vast and wealthy city of Babylon as one of the capitals of their empire, and generally passed the winter there. In B.C. 331 the last Persian king of the Achæmenid race, Darius Codomannus, was defeated by Alexander the Great, who entered Babylon in triumph; but after his return from his Indian campaign he died in this city B.C. 325. The general Seleucus obtained Babylonia as his share in the division of Alexander's empire, and removed the seat of government to his newly-founded city of Seleucia, but in B.C. 249 the Parthians, under Arsaces, seized this region from the Macedonians. The decay of the city of Babylon was now rapid; the Parthian capital Ctesiphon, built close to Seleucia, drained away the inhabitants from the ancient metropolis, which it was their policy to extinguish. It soon became a mere wilderness, surrounded by a low wall, and was used as a hunting ground by the later Parthian and Sassanian kings. When the Arabs conquered the last of the Sassanian monarchs in A.D. 632 hardly a trace of the city of Babylon was left; the name henceforth simply marked a district or a mound.

Language and Literature.—The language and the writing of Babylonia were nearly identical with those of Assyria, and much that has been said of the latter applies to the former. [ASSYRIA.] The written character, however, varies somewhat in form. The most important cuneiform tablets that we possess were found in Assyria, not in Babylonia; from the latter country at present little has been brought except a large collection of commercial tablets (or "contract-tablets") and some astronomical records; a certain number of bricks, stamped with the names and titles of the kings in whose reigns they were made, and of stone objects engraved with votive or dedicatory inscriptions; a considerable number of engraved cylindrical seals, and a few historical cylinders and tablets of the later monarchs. It would appear, however, that much of the religious and legendary lore of Assyria was of Babylonian origin; for the Accadian language, from which many of the Assyrian tablets are translated, was the original speech of the inhabitants of the southern kingdom. The historical cylinders of Nebuchadnezzar and Nabonidus are written in the same style as those of the Assyrian kings, and describe their building operations. The oldest documents of Babylonia are in the Accadian language alone, without any translation by the side, such as those of Gudea from Tello; these contain little besides formulæ of dedication. In the time of Hammurabi we find bilingual inscriptions, in which the Accadian is accompanied by a Semitic translation. Among the latest Babylonian documents are the astronomical records; some of which, dating from the period of the Parthian kings, contain most exact observations of the movements of the moon and planets.

Religion.—As the god Ashur was the chief divinity of Assyria, so Bel-Merodach was the head of the Babylonian Pantheon. His vast temple, which, with the other great temple of E-zida, now Birs Nimroud, it was the pride of the Babylonian kings to maintain, was still standing in the time of Herodotus; and, though it was in a ruined state, Alexander the Great proposed to restore it; hence we have full descriptions of it in the classical writers. The priests attached to this temple were richly endowed, and the maintenance of the worship involved a great outlay. The impression made by this temple and its worship on the Jews during their captivity is reflected in the history of Bel and the Dragon; the apocryphal Epistle of Baruch also contains interesting allusions to the Babylonian rites. The other gods of Babylonia would seem to have been

the same as those of Assyria [ASSYRIA], which country borrowed its religion, as well as the rest of its culture, from the southern kingdom. Bel and Nebo are mentioned together as the principal divinities of Babylon by Isaiah (xlvi. 1). The great importance of the religious processions of Babylonia is shown in the history of Nabonidus, to whom the neglect of certain customary processions, in which images of the gods were carried, is attributed as a great crime. Closely connected with Babylonian religion was the astrology for which the Chaldæan

hanging draperies. In a small temple near this palace M. de Sarzec found curious circular columns, arranged in groups of four, and formed entirely of brickwork—this must have been a rare experiment in architecture. That the king, Gudea, was himself an architect, appears from some statues of diorite, a material which had to be procured from the peninsula of Sinai, in which the monarch appears seated, with architectural plans, drawing materials, and graduated rule upon his knees; these statues are now at the Louvre, and show some skill in



(*a*) BABYLONIAN ART. (*b*)

(*a*) The record of the sale of a field. (*b*) The grant of certain privileges by Nebuchadnezzar.

priests were so famous, and which they had studied for countless ages. There were several schools of astrologers, also specially called the "Chaldæans," such as those of Sippara and Erech, which held different doctrines. Their business was to foretell the future by the stars, and to interpret omens and dreams.

The Arts.—Owing to the less extensive excavations undertaken in Babylonia we are unable to say as much of Babylonian as of Assyrian art. The only buildings that have been fully excavated in the southern kingdom belong to the earliest period of Chaldæan history. The palace of Gudea, at Tello, resembles in many respects the palaces of Sennacherib and Ashur-bani-pal; it was entirely built of brick, the only material available in Babylonia, where there is a complete lack of stone, and of all timber except the fibrous palm tree; it stood on a great platform, designed to raise it above the inundations; its walls were sometimes as much as 8½ ft. thick, and the chambers were probably vaulted in many instances. For decoration, however, it probably had to depend on colouring, and

sculpture, although the want of modelling of the limbs, the stiff posture, and the treatment of the drapery belong to an early stage of art. Several very early bas-reliefs have also been brought from Tello, such as the lion and eagle, or the famous Vulture Stela, both now in Paris. Of early bronze work we have examples in small statuettes of Gudea, buried as talismans in the foundations or walls of the palaces, and in figures representing priests or priestesses bearing sacrificial offerings in baskets upon their heads, like the Greek Canephorae; some of these latter works are of the time of Gudea, some of Kudurmapuk and Arad-Sin. Of later Babylonian sculpture we have examples in the numerous boundary-stones, with the signs of the zodiac, and sometimes human figures in low relief upon their surfaces; the most remarkable of these exhibits the figure of Marduk-nadin-akhi, B.C. 1120, in his tiara and richly-embroidered robes. Clay statuettes have also been found in Chaldæa, some of remarkably skilful workmanship; the most numerous of this class are figures of the goddess Ishtar, of a late period, not modelled by the hand, but cast in a

mould. Of all the arts, perhaps, the work of the embroiderer's needle has been that chiefly connected with the name of Babylon. "Babylonish garments" were already highly prized in the time of Joshua (Josh. vii. 21); the prophet Ezekiel speaks of the splendid robes of the Chaldæan princes; and down to the time of Alexander, and later still under the Roman Empire, Babylonian robes and hangings were everywhere in the greatest request, and valued at very high prices. The designs chosen by the embroiderers were originally religious emblems of deep mystical significance, and probably thought of great importance as charms and talismans for the welfare of the wearer. On the robe of Marduk-nadin-akhi, mentioned above, we see the Tree of Life repeated many times, and bands of rosettes, perhaps representing the open lotus. Symbolical figures of genii and animals, and the king himself engaged in prayer or sacrifice, also frequently occur; and all these designs were borrowed by the Assyrians, with the rest of the arts, from the more ancient civilisation of Babylonia.

Present Condition.—The greater part of Babylonia is now included in the modern Turkish pashalik of Bagdad, a city on the Tigris of about 60,000 inhabitants, which, founded by the Caliph El-Mansûr in A.D. 763, is to some extent the successor of the ancient Babylon, and by this name it was often called by travellers in former days. Forty-eight miles S. of Bagdad are the ruins of Babylon, opposite the modern town of Hillah, from which they are separated by the Euphrates; and the whole country, which is now for the most part a dreary desert, or a succession of reedy marshes, is dotted with artificial mounds covering the remains of ancient cities. Eighteen miles S.E. of Bagdad, on the Tigris, stands the ruin called *Tak-Kesra*, all that is left of the magnificent vaulted palace of the Parthian kings at Ctesiphon. Many of the beds of the ancient canals are still visible, and some of them still in a serviceable condition. The port of Bagdad is Basra or Bassorah, on the Shatt-el-Arab or confluence of the Tigris and Euphrates, about 50 miles from the Persian Gulf. It is still famous for its dates, and has a considerable trade, especially with India. The population consists of Turks, Arabs, Nestorian Christians of Syrian descent, and in the south are the remnants of the Mendaites, Sabæans or Christians of Saint John, who preserve a peculiar dialect of Syriac, in which the sacred books are written. The language in general use is Arabic, but Persian is widely understood. Many of the ancient customs are still preserved; for navigating the rivers, rafts, called *kelleks*, supported on inflated skins, and circular wicker-work boats, called *kufahs*, are still employed, as we see them in the ancient sculptures and read of them in old writers.

Baccarat (Fr. *baccara*), a well-known French game of chance, played for money between a banker and several punters. In England it is illegal.

Bacchanalia, in the strict sense the triennial festival of Bacchus, introduced among the native population of Italy from the cities in Magna Græcia. Its character was entirely transformed, according to Livy, by Pacula Annia, a Roman matron. The gross immoralities which accompanied its new form led to its suppression in 186 B.C. by the Roman Senate, after inquiry by a special commission. Commonly the term is applied to any scene of drunkenness and disorder.

Bacchus (Gk. *Bacchos* = *Iacchos*, probably from *iacho*, *i.e.* the cry of the reveller), the name, first found in Herodotus, of the god of the vine, known in later Greece as Dionysus, and in Rome also as Liber. According to the prevailing legend, he was the son of Zeus and Semele, daughter of Cadmus of Thebes. His mother, having rashly desired to see her divine lover in all his glory, was scorched up by his presence. Her unborn child was sewn up in the thigh of Zeus, and hence got the epithet "twice-born," the dithyrambs sung in his praise suggesting the same story. Reared on Nysa, he soon set forth on his travels to spread the culture of the grape, and the orgiastic worship promoted by the use of wine. He went as far as India, and his return thence in a car drawn by tigers was a favourite subject of artists and poets. Lycurgus of Thrace, Pentheus of Thebes, the daughter of Minyas, and Icarus of Attica were punished with death for their opposition to vinous indulgence. In his wanderings the god was attacked by pirates off Naxos, and this incident led to his love affair with Ariadne. Phrygia and Lydia adopted his cult with much zeal, and as Sabazius Bagaios he was venerated on Mount Tmolus. Homer has very little to say about him, and Herodotus regards him as an inferior deity. His connection, through the sacrifice of the goat, with Greek tragedy came later. The Orphic poets made him visit Hades, and thus he came into the Eleusinian mysteries, and was even alleged to be the son of Persephone. He was introduced to Rome through Magna Græcia. The Thyrsus, or ivy-wrapped staff, the Corymbus, or ivy-wreath, the Cantharus, or cup, and the Phallus were his emblems. Sometimes he took the form of an effeminate youth, sometimes of a babe, sometimes of a bearded man.

Baccio Della Porta, known more generally as "Fra Bartolommeo" di San Marco, the name he assumed when under the influence of Savonarola he became a Dominican, was born at Savignano in 1469. He distinguished himself early as a painter by his powerful colouring, skilful treatment of drapery, and knowledge of the human form. He was the precursor and teacher of Raphael. On entering the monastery at Florence, in 1500, he devoted himself exclusively to religious art, and his St. Mark and St. Sebastian are the finest of his works. To him is attributed the first use of the mannikin or jointed lay figure. He died in 1517.

Bach, the name of a family of musicians, the most illustrious member of which was Johann Sebastian Bach, who is rightly counted among the greatest musicians which the world has ever seen. The founder of the family was Veit Bach, a baker and miller, who left his native land, Hungary, in 1550, to escape from the persecution of the Turks, who were then masters of the soil. He had two sons,

who displayed great talent for music, in fact the love for the art was the distinguishing characteristic of the whole family, so that for two centuries, through six generations, no less than sixty members of the family became eminent in the art. The name of Bach and music were at one time and in one place synonymous. At Erfurt, where one branch of the family settled, the town musicians were called "Bachs," whether they bore that name or not.

Veit's eldest son followed his father's trade, his second son became a carpet maker. Their leisure hours were devoted to music, and in course of time, as the family increased and became scattered, they kept up their connection by a yearly meeting, either at Arnstadt, Erfurt, or Eisenach, where they spent the day in exchanging experiences, and making music.

Johann Sebastian Bach was the youngest son of Johann Ambrosius by his first wife, Elisabeth Lömmerhirt. He was born at Eisenach, on the 21st March, 1685, and died on the 28th July, 1750. He lost his parents before he had completed his tenth year, and his musical education, begun by his father, was continued by his brother, Johann Christoph, who was his senior by fourteen years, and who held the post of organist at Ohrdruf, one of the most beautiful of the Thuringian valleys. Here he remained five years, and excited the jealousy of his brother by the remarkable progress he made in music. A book of organ studies which the boy desired to possess was locked up in a latticed bookcase, but young Bach, by rolling it up, managed to draw the precious volume forth, and copied the whole by the light of the moon during several months, only to have his labour taken from him when it was completed. It was restored to him after his brother's death a few months later. In 1700 he went to Lüneburg to sing in the choir, and to pursue his musical studies at the School of St. Michael's. He often journeyed to Hamburg to hear Reinken, the most famous organist of his time, and to learn by hearing. When he removed to Weimar as violinist, and afterwards to Lübeck, he once walked 250 miles to hear Buxtehude the organist. Although pinched by poverty, he had earned a great reputation as an organist himself, and had many offers from different churches. He selected Mühlhausen, and settled there for a time, and married the daughter of Michael Bach, his cousin. He found Weimar a more suitable place, and he took up his residence there. On one occasion he travelled to Dresden for a "musical tournament" with Marchand, a French artist. He defeated the Parisian, and a second trial was arranged, but Marchand at the last moment failed to appear. Bach accepted the post of *chef d'orchestre* to the Duke of Cöthen, and upon the death of Kuhnau was appointed musical director and choirmaster or cantor of St. Thomas's School of Leipzig, and here he remained until his death. Bach married his second wife, Anne Magdalene, the daughter of Wülkens, one of the Court musicians. His last days were embittered by the loss of sight. His compositions are full of ingenuity and power, and are in many styles, but he is chiefly pre-eminent for his wonderful mastery of the fugal form as well as for his strict conformity to law. He improved the art of playing upon keyed instruments, and taught the possibility of playing in all keys.

His sons by his first wife, Wilhelm Friedemann, also called the "Halle" Bach, a musician of great genius, was the father's favourite; but Philip Emanuel, the second son, the Berlin Bach, musician to Frederick the Great of Prussia, was his greatest comfort. His other sons, Johann Christoph, the "Bückeburg Bach;" Johann Christian, known as the "English Bach," all from the places in which they settled, continued the genius of the family. The last descendant, William Bach, son of the "Bückeburg Bach," died in Berlin in 1845, at the age of ninety, and with him ended the current of genius which had flowed with varying strength in one family for a period of nearly three hundred years in an uninterrupted line.

Bacharach (Latin *Ara Bacchi*, altar of Bacchus), an old town in Rhenish Prussia, on the Rhine, 30 miles S.E. of Coblentz by rail. In the Middle Ages it was a great market for Rhine wine. The ruined church of St. Werner, an elaborate Gothic edifice in the form of a trefoil, commemorates a boy saint who (according to the legend) was murdered by the Jews in 1293, and whose body miraculously floated up the river to this place. Blücher crossed the Rhine here on Jan. 1st, 1814.

Bachelor (Fr. *bachelier*, probably from the Low-Lat. *baccalarius*, cowherd, *bacca* being the Low-Latin form of *vacca*, cow; but derived by some from a Keltic root meaning *small* or *young*), a term first used to denote a particular kind of inferior tenant of church lands; then applied to probationers for the monastic life; later on, to knights who had not yet been able to raise their banner in the field; and in the thirteenth century adopted in the University of Paris to denote candidates who had undergone their first university trials and were authorised to lecture, but were not yet full teachers. Later it was used in other universities, and written *bacca laureus* (as if it meant "crowned with laurel-berries"), whence the French *baccalauréat*—"bachelor's degree." It now generally denotes the first degree taken, the lowest degree which exempts its holder from strict university discipline. In practice the bachelor's degree in arts at Oxford and Cambridge is followed by the master's without further examination, while few London graduates proceed beyond it. Lastly, the term came to be applied to unmarried men, as probationers for matrimony.

Bachelor's Buttons, the popular name for the double-flowered variety of the common buttercup (*Ranunculus acris*), sometimes applied to that of the red campion (*Lychnis diurna*), or to the black knapweed (*Centaurea nigra*).

Bacillus (= a little rod), one of the divisions of the group of Bacteria (q.v.). A bacillus may be roughly characterised by saying that it is at least twice as long as it is broad, and it thus differs from those forms of bacteria, cocci, which possess a more or less rounded shape. Bacilli may be capable or

non-capable of movement; they often grow into long threads, and in these rounded or oval spores may be developed. These spores are very important bodies; they offer much greater resistance to heat and other destructive influences than do the rods from which they are developed. A spore may readily be distinguished from a coccus by its high refrangibility, and its peculiar behaviour with staining reagents; it is not, however, always so easy to distinguish a spore from a vacuole, or from other abnormal developments in the bacterial protoplasm; in cases of doubt the test of resistance to heat must be applied, or it must be ascertained whether the supposed spore is capable of sprouting and producing a bacterium by germination.

Certain bacilli are known to cause diseases in man and animals. The bacillus anthracis (*see* Plate of Bacteria, Vol. V., Fig. 8) produces the disorder known as anthrax (woolsorter's disease of man, splenic fever or splenic apoplexy of animals); the bacillus tuberculosis (Fig. 1) is the cause of consumption, the bacilli of glanders (Fig. 9), leprosy (Fig. 2), and typhoid fever (Fig. 6), the tetanus bacillus and the bacillus diphtheriæ, and among bacilli causing disease in animals, those of swine fever, mouse septicæmia, rabbit septicæmia, and fowl cholera may be mentioned. Other well-known bacilli are the hay bacillus, the bacilli of lactic and butyric acid fermentations, the bacillus of blue pus, and the bacillus prodigiosus. A curved form is often found associated with cases of cholera, and may be the cause of that disease; it is known as the comma bacillus of Koch, but is simply a curved rod, so that the expression comma bacillus is misleading. It really belongs to the Spirilla, and not to the group of bacilli at all.

Back, Sir George, the great Arctic explorer, was born at Stockport in 1796, and entered the Royal Navy in 1808. Captured by the French, he remained a prisoner of war for five years. In 1818 he volunteered to join Sir John Franklin in his Polar Expedition, and his courage and endurance met with high commendation. In 1833 he took charge of the party sent in search of Sir John Ross, and in 1836 commanded the *Terror* in a dangerous but fruitless voyage. Knighted in 1837, and made Rear-Admiral in 1859, he took an active interest in the Royal Geographical Society, and in more recent explorations. He died in 1878, leaving a sum of money to be devoted to researches in the Polar Seas.

Backgammon (apparently *back-game*, from certain features in the play; or from Danish words meaning *tray game*, or Welsh meaning *little battle*), a well-known game of chance and skill combined, played with dice and draughts by two players on a special board. Possibly it dates from the tenth century. It is now not very largely played.

Backhuysen, Ludolf, born at Emden in 1631, son of the Secretary to the States General of Holland, was destined for official life, but he abandoned this career for painting. He formed his own style from the practical study of marine nature, and acquired unrivalled skill in depicting agitated waves and ships lashed by wind and water. His death occurred in 1709.

Backstaff, an obsolete nautical instrument for taking the sun's altitude. It was so called because the observer, when taking his observation, turned his back to the sun. It was also called Davis's quadrant, from its inventor, John Davis, the navigator. The French called it the English quadrant. It superseded the more ancient Cross-staff, and consisted of two concentric circles, the arc of one radius being 60° and of the other 30°, with three vanes and the necessary frame. It was introduced about 1590, improved by Flamsteed, and generally superseded by Hadley's reflecting quadrant in 1731, though here and there it was in use up to the end of the 18th century.

Bacon, Delia, an American authoress (1811–1859), best known as the first prominent supporter of the eccentric theory that Shakespeare's plays were really written by Francis Bacon, which has since been supported by Mr. Ignatius Donnelly.

Bacon, Francis, Lord Verulam and Viscount St. Alban, born 1561 in the Strand, was the son of Sir Nicholas Bacon, the famous Lord Keeper. His mother was Anne Cooke, whose eldest sister was married to Lord Burleigh. He had a brother, Anthony, two years his elder. Both of them matriculated at Trinity College, Cambridge, in 1573. Little is known of Francis Bacon at the University. He appears to have been a delicate youth, but quick and studious. According to tradition Queen Elizabeth herself noted his ability. In 1576 he was admitted to Gray's Inn, and went to Paris with Sir Amyas Paulet, the British Ambassador. He remained in France till the sudden death of his father in 1579, when he returned, and finding himself scantily provided for, settled down to the profession of the bar. In 1584 he took his seat in the House of Commons as member for Melcombe Regis, representing Taunton two years later, and Liverpool in 1588. At this period he was evidently anxious to secure some official position which would allow him to follow up the philosophical aims that he already had in view, but, though he received the reversion of the valuable clerkship to the Star Chamber, this place did not fall vacant for twenty years, and meanwhile he was in very straitened circumstances, his habits being decidedly extravagant. In 1593 he was returned for Middlesex. His opposition to the interference of the Lords in a matter of supply and to the granting of a threefold subsidy in less than six years incurred the queen's displeasure. He had already attached himself strongly to the Earl of Essex, but even the influence of the favourite was unable to procure him the post either of Attorney or Solicitor-General. He was, however, employed occasionally in legal business by the Crown, was made a Queen's Counsel, and received a grant of land and a gift also from his patron. He was again disappointed in seeing Lady Hatton, Burleigh's granddaughter, married to his rival Coke. In 1597 he sat for Ipswich, and seems to have endeavoured in vain to exchange his reversion of the clerkship

of the Star Chamber for the Mastership of the Rolls. Meanwhile, in spite of his admonitions, Essex was pursuing a headstrong—if not a treasonable—course, and Bacon found himself in an awkward position. He estranged himself for a time from the queen by endeavouring to shelter his protector, but was in the end compelled to take part in the prosecution that sent the Earl to the scaffold, and to draw up a justification of the course that Elizabeth pursued. At the death of the queen his circumstances were still so bad that he had to sell part of his land to clear off debts. He begged for the honour of knighthood, having in view marriage with an alderman's daughter, and by his advocacy of the Union, as well as by his reputation for science, he hoped to conciliate the favour of James I., to whom in 1605 he dedicated the first two books of the *Advancement of Learning*. In 1606 he married Alice Barnham, the lady above referred to, who survived him many years. There appears to be no ground for the assertion that he was influenced in his choice by mercenary motives. In 1607 he opposed the conference between the Lords and Commons on the question of the Union, and in the same year became Solicitor-General. This office and the reversion of the clerkship to the Star Chamber, which fell in next year, gave him the tranquillity which he needed for grappling with his philosophical task, and the *Instauratio Magna* was begun with zeal. Three years were spent in professional work and in re-editing his essays, till at last in 1612 he became Attorney-General. His conduct as regards the cases of St. John and Peacham has been much discussed, but it is admitted that he merely performed his official duty, as he also did in 1616 with reference to the murderers of Sir Thomas Overbury. Next year he became Lord Keeper, and in 1618 was made Lord Chancellor, when with marvellous industry he cleared off all the arrears of cases in the course of a month. In 1620 he dedicated to the king his *Novum Organum*. But in 1621 his enemy Coke once more returned to Parliament, and at his motion a committee was appointed to inquire into public grievances. The report contained accusations of corruption against the Lord Chancellor, who at first stoutly repelled the charge. Finally twenty-three specific cases were alleged, and, after seeing the king, Bacon in somewhat guarded language admitted his guilt. That he received gifts from suitors there can be no doubt, but it is contended that he never took money for giving a judgment. He was sentenced to pay a fine of £40,000, to be imprisoned in the Tower during the king's pleasure, and to be disqualified from all offices, his titles being left undisturbed. His incarceration lasted but a few days and the fine was practically remitted, but he lost all his income, except a pension of £1,000 from the king and his small private fortune. He was summoned to return to Parliament, but a sense of shame or a love of science led him to prefer retirement. At first he resided at Gorhambury, where he wrote his *History of Henry VII.* and translated the *Advancement of Learning* into Latin. Then he came to Bedford House, and lived there or at Highgate engaged in scientific or literary pursuits. In 1626 he caught a cold whilst investigating the value of snow as a preservative of meat, and died of fever on April 9. He was buried in the church of St. Michael at St. Albans. Though Bacon's knowledge of natural science was not on a level with the most advanced science of his age ("the Lord Chancellor writes on science," said Harvey, "like a Lord Chancellor"), yet the *Novum Organum*, which embodies his attempt to formulate a new method of discovery, is the basis of modern inductive logic, and contains many anticipations of modern scientific ideas.

Bacon, Sir Nicholas, was born at Chiselhurst in 1510, and educated at Benet's (now Corpus Christi) College, Cambridge, and Gray's Inn. He obtained the grant of the monastic estate at St. Edmund's Bury, and other rewards, for his conversion to Protestantism, from Henry VIII. During Mary's reign he was out of favour, but he avoided trouble, and Elizabeth on her accession made him privy councillor and keeper of the Great Seal. He carefully kept out of party intrigues during his career, and seems to have been a wise and honest, if not an entirely disinterested, adviser of the crown, and his eloquence was considerable. He was twice married, Francis Bacon being a son by his second wife. He died in 1579.

Bacon, Roger, born near Ilchester in 1214, went to Oxford under the protection of Richard Grosseteste, Bishop of Lincoln, and by his ability won the favour of other great patrons. Completing his studies at Paris, he returned to Oxford, and entered the order of St Francis. He took up scientific pursuits with such ardour and success as to incur suspicions of dealing in magic. Pope Clement IV., who had been legate in England, heard of his fame, accepted a copy of his *Opus Majus*, and put a stop to his persecution, which was, however, renewed on the pope's death. Bacon passed ten years in prison, and was only released to die in 1294. His intellect, obscured by the superstitions of his day, was acute and far-reaching. He seems to have grasped every subject of speculative or scientific interest, and to have applied, intuitively, inductive methods to many branches of inquiry. In this way he often foreshadows modern discoveries. His practical achievements were great, but not destined to bear fruit for several generations. Gunpowder, the telescope, the air-pump, the diving-bell, and the camera obscura were conceived by his genius. The Gregorian Calendar, too, was one of his premature suggestions. Besides the *Opus Majus, or Roots of Wisdom*, he wrote about eighty treatises, some of which are included in the *Thesaurus Chemicus*; others have never been printed. Gunpowder is described in *De Nullitate Magiæ*, and his *Means of Avoiding the Infirmities of Old Age* was translated by Browne in 1683.

Bacteria, the name applied to certain organisms of microscopic size, which constitute the lowest division of those forms of vegetable life called fungi. The divisions of the group of fungi have undergone many changes of nomenclature of late years; it is now customary to apply the term

"bacteria" as a synonym for the division known to botanists as the Schizomycetes or fission fungi. The fact that bacteria multiply by repeated division justifies the application of this term, derived as it is from two Greek words σχίζω, *to split*, and μύκης, *a fungus*. The word bacterium means a little rod, and was at one time reserved for certain members of the group of Schizomycetes, but as already stated the whole group is now commonly spoken of as bacteria. The bacteria are single cells; an idea of their size may be obtained from a study of the plate, noting the magnifying power employed. They may assume various shapes (*see* Plate). There are spherical forms known as "micrococci;" two of these may adhere together forming a dumb-bell shaped double coccus or "diplococcus;" rod-shaped forms are called "bacilli" (*bacillus*, a little staff); intermediate forms between cocci and bacilli, *i.e.* short rods, used to be called, and are still spoken of, as "bacteria"; and thus, as already incidentally observed, this word is unfortunately used in a double sense. Again several rods may adhere together forming filaments known as "Leptothrix" forms, while chains of micrococci are spoken of as "streptococci."

Figs. 1 and 2.—TUBERCLE BACILLUS. (*From a photograph by E. C. Bousfield, Esq.*)

Curved rods also occur, as, for instance, in the organism known as Koch's cholera bacillus, and if several such curved bacilli are united, end to end, the resulting spiral form is known as spirillum, while a long and closely wound spiral is called a spirochæta.

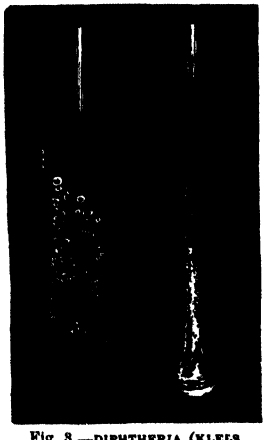


Fig. 3.—DIPHTHERIA (KLEBS LOFFLER).
Fig. 4.—STREPTOCOCCUS PYOGENES. (*From a photograph by E. C. Bousfield, Esq.*)

Some bacteria are provided with a whip-like "flagellum," which gives them the power of active movement, others are non-motile. Very near relations of the bacteria are met with in certain humble members of the great family of algæ or seaweeds. These lowliest algæ are, like the bacteria, unicellular, devoid of sexual organs, and present many other points of similarity, but one great difference, namely, that they contain the peculiar green colouring matter known as chlorophyll. The absence of chlorophyll in bacteria prevents their obtaining carbon from carbonic acid gas, and they must therefore live upon ready-formed carbon compounds, such as exist in animals or plants. In other words, the bacteria are parasitic, feeding upon organic matter, and in some cases actually attacking living organisms. It is this last peculiarity which attaches such vast importance to the study of bacteria, and the researches of Pasteur and others, which have shown how the life history of fission fungi is bound up with certain fermentations, with putrefaction, and finally with disease, gave a powerful impetus to the scientific study of these minute plants, which are now recognised to be fraught with the most wonderful power for working good or ill to higher forms of life.

The importance of the study of bacteria, then, was first recognised in investigating the *rôle* played by them in fermentation processes. Pasteur showed that milk turns sour because of the growth within it of a bacterium, which converts the sugar of milk into lactic acid; again, in the manufacture of vinegar a bacterium is at work, and is the cause of the conversion of alcohol into acetic acid. After the establishment of these facts the question arose whether the phenomena of putrefaction might not also be due to bacterial growth, and this led to a great controversy. It was maintained, on the one hand, that bacteria could never develop in nutrient material unless similar bacteria already existed there, or were introduced from without; on the other hand, the doctrine of spontaneous generation was upheld, and it was urged that it was impossible to prevent putrefactive processes from occurring in organic infusions, however carefully they were preserved from bacterial intrusion. The difficulty was not easily set aside so small were the living units in question and so universal is their distribution; their minute spores are readily borne from place to place by currents of air, and every drop of water teems with bacterial life. It was found, however, in course of time, that prolonged boiling was uniformly effectual in destroying all germs, and that nutrient material which had been exposed to this treatment in flasks plugged with cotton wool could be kept for an indefinite period without undergoing putrefactive changes. The cotton-wool plug served the purpose of a filter, permitting interchange of gases between the inside of the flask and the outer world, but preventing any organisms reaching the interior of the flask from outside. Nutrient media which have thus been prevented from putrefying are said to be "sterilised;" that their remaining unchanged is due to the absence of bacterial life within them is easily shown by noting the effect of introducing germs into them from without. Such sterile media are now largely employed in studying the growth of bacteria, and

when due precautions are taken it is not difficult to ensure securing what is called a "pure cultivation" of a given organism; that is to say, one and only one kind of organism being introduced into the medium, there is a development within it of organisms of that kind and of that kind only. Thus the theory of spontaneous generation has been completely discarded; putrefactive processes are now known to be due to the growth of bacteria, and by studying the differing ways in which different organisms affect nutrient material an invaluable means of classifying bacteria and of studying their life history has been placed at the disposal of bacteriologists.

Meanwhile, however, further and yet more important truths were being elicited with regard to the functions of bacteria. The part played by them in fermentation and in putrefaction was demonstrated, and then came the great discovery of their importance in disease.

It had been noticed that the blood of animals dying of a disease known as splenic fever or anthrax contained bacilli; a minute drop of such blood was found to be capable of conveying anthrax to other animals, and the question arose whether the bacilli were not the cause of the disease. Davaine upheld this view, and the subsequent researches of Koch have placed the matter beyond all doubt. The bacillus anthracis, the bacillus in question, has now been carefully studied in pure cultivations; it has been found to grow into long threads, to produce spores, and to grow and affect the nutrient material in a manner peculiar to itself, and infinitesimal portions of the growth taken from cultures many times removed from the original source produce the disease known as anthrax in suitable animals. Anthrax is but rarely met with in the human subject; it occasionally, however, presents itself among those whose work brings them in contact with the hides of diseased cattle, and one of the forms in which the disease is met with in man is that known as "woolsorter's disease."

The great discovery of the cause of "splenic fever" established on a firm footing the germ theory of disease, and led to a vast display of activity in this field of work. It was soon found, however, that the difficulties of the subject were considerable, and many rash generalisations have been made. None the less, the facts elicited have proved of such importance as to revolutionise some of the conceptions of twenty years ago. Consumption has been shown by Koch to be caused by a bacillus, the tubercle bacillus (*see* Plate Bacteria, Vol. V., Fig. 1); the bacilli by which the diseases glanders and leprosy are produced have been demonstrated, and there are good reasons for supposing that the germs of tetanus, diphtheria, relapsing fever, cholera, typhoid, erysipelas, and other diseases occurring in man are now known; while several disorders affecting animals have been undoubtedly placed in the category of germ diseases.

Great advances have been made, too, in technique, so that further additions to the knowledge of germs should be speedily forthcoming. The use of aniline dyes in staining bacteria, the employment of gelatine and agar agar in culture media, and the method of plate cultivation, introduced by Koch, may be alluded to in passing.

The "gelatine tube" is a glass tube containing a sterilised mixture of gelatine and broth, which can be liquefied by exposure to a temperature of about 25° C. This degree of heat, while it does not destroy the germs, admits of agitation of the resulting liquid, and thus of the uniform diffusion throughout its substance of any bacteria it may contain. The liquefied gelatine can then be poured out and allowed to set, and wherever a germ happens to be fixed, there a colony produced by the multiplication of that germ will in time appear. By inoculating sterile gelatine with a minute droplet (diluted if necessary) of material, the bacteria therein contained can thus be separated from one another.

Agar agar, or Japanese isinglass, is used where it is desirable to grow bacteria at a relatively high temperature; gelatine would, of course, be liquefied if exposed to the body temperature, whereas the melting point of agar agar is considerably higher than this.

Fig. 5.—BACILLUS PYOCYANEUS.
Fig. 6.—ANTHRAX BACILLUS.
(*From a photograph by E. C. Bousfield, Esq.*)

The six tubes depicted in the illustrations show the characters presented by the growth of various organisms on nutrient material. Figs. 1 to 4 are "streak cultures," *i.e.* are produced by drawing a platinum wire charged with the material over the surface. Figs. 5 and 6 are "stab cultures," the needle being thrust perpendicularly into the nutrient medium.

The possibility of separating germs from one another by plate cultivation depends upon the varying characteristics which the colonies of different organisms present. In some cases colours are produced by bacteria, as for example the brilliant red of the micrococcus prodigiosus, a fungus of wide distribution which so often presents itself on mouldy bread; the yellow colour of staphylococcus aureus, the bluish green of bacillus pyocyaneus, and so on; by these colour phenomena and by other characteristics it is possible in many cases to pronounce upon the nature of a colony without examining its constituent bacteria microscopically.

To turn now to the various means which have been suggested for combating the ravages of bacteria when they attack the bodies of men and animals. Germs are destroyed by certain chemical substances which are known as antiseptics (q.v.); and the antiseptic treatment of wounds advocated by Lister was one of the first practical applications

of the facts of bacteriology to therapeutics. But the question was how to prevent injury being caused by germs capable of flourishing inside the body, and to this problem Pasteur addressed himself.

The great Frenchman found that by various means bacilli could be deprived of their virulence, "attenuated" as it is called; so that cultures of an organism which would ordinarily prove fatal to an animal could be rendered inert, or else modified so that they only produce the disease in a mild form. Moreover, Pasteur knew that many disorders only occur once in an individual's lifetime; for example, one attack of scarlet fever protects the patient against a subsequent attack, and thus arose the system of protected vaccination with attenuated cultures; the idea being to produce the disease in a mild form and so render the vaccinated person "immune," *i.e.* incapable of being infected. Pasteur has applied his method in anthrax, hydrophobia, and other diseases. Another theory of protective vaccination is that the chemical substances produced by growth of germs are inimical to their development, and when inoculated into a patient hinder or prevent the occurrence of the disease in question. This method has been applied by Koch to the treatment of consumption.

The doctrine of Phagocytosis (q.v.) may here be alluded to. It has been supposed by Metschnikoff that disease is in many cases a struggle for existence between invading bacteria and certain cells of the body possessed of amœboid movement; either the bacteria destroy the cells, or the cells, hence called phagocytes or devouring cells, eat up the bacteria. In the first case the patient dies; in the second, the germs succumb while the patient recovers. It is questionable, however, fascinating as the theory is at first sight, whether the cells are the actual destroyers of the germs; at all events, animal fluids, apart from cells, have very definite germicidal powers.

The study of the chemical substances produced by germs in the course of their development promises to be fertile in results as regards the treatment of diseases. Certain it appears to be that most powerful poisons, generally known nowadays as toxines, result from bacterial growth. The hope may be entertained that as the nature of these poisons becomes more accurately known methods of dealing with them may be devised; indeed, important results have been already obtained—for example, in the antitoxic treatment of diphtheria

Bactrian, a term now commonly used as a substitute for *Zend*, to indicate the eastern branch of the old Iranian language at one time current throughout Bactria, a province of the ancient Persian empire; two varieties: Gâtha of the oldest Gâthas (hymns) attributed to Zarathrastra (Zoroaster); and Avesta, for many centuries current in East Irania, died out about the 4th century B.C.

Baculites, a genus of Cephalopoda, belonging to the AMMONITES; it is restricted to the Cretaceous period.

Bacup, a town of Lancashire on the Lancashire and Yorkshire Railway, 12 miles E. of Blackburn. Cotton-spinning and weaving are the chief industries; but there are also dye-works and foundries. Coal is found in the neighbourhood. The public buildings are good and the handsome market-hall was built in 1867. Pop. (1901), 22,505.

Badajos (classic *Pax Augusta*), a province in the S.W. of Spain with its capital, an ancient fortified city, on the river Guadiana, about five miles from the Portuguese frontier. The tortuous streets contain many churches and monasteries, now used as barracks and hospitals, and the cathedral is itself a kind of fortress. In the Peninsular war Badajos was captured by Soult (1811), and after two futile attempts retaken by the British under Wellington (April 6, 1812). The siege and assault cost the assailants 5,000 men in killed or wounded. Terrible scenes were enacted in the sacking of the town, which lasted two days. The painter Morales (El Divino) was born here.

Badakar, the "Burghers" of English writers, a Dravidian people, Nilghiri Mountains, South India, partly subject to the Todas and Kurumbas; Saiva sect; eight castes; speech Kanaric; light brown colour; black wavy hair; small stature.

Badakshan, a country of Central Asia, lying on the N.E. frontier of Afghanistan, in the valley of the Kokcha, a tributary of the Oxus, and on the flank of the Hindu Kush range. The district is therefore mountainous, rising sharply from 500 to 15,500 feet above sea-level. The mineral resources are great, lapis-lazuli and rubies being abundant. Faizabad is the most fertile and important of the sixteen administrative divisions, and is the seat of the government of the Mir, who is a vassal of the Amir of Kabul. The inhabitants are Persian-speaking Mohammedans, and the slave trade flourishes among them. Badakshan extends 200 miles from E. to W., and 150 miles from N. to S.

Badakshi, BADAKHSHÂNI, the ruling people of the Afghan province of Badakhstân, Upper Oxus; of Galcha (East Iranian) stock, though physically more like the Cashmirians and other Aryans of North India; at present they speak pure Persian, and are mainly sedentary agriculturists.

Badalona, a sea-port of Spain on the Mediterranean, about five miles N.E. of Barcelona.

Badderlocks, the Scottish name of *Alaria esculenta*, the best of all the edible sea-weeds when eaten raw. The name is a corruption of Balderlocks, or the locks of Balder, a Scandinavian deity. The plant is also known as Henware, Honeyware, or Murlins. It belongs to the *Laminariæ* or kelps, a group of the olive sea-weeds. The part eaten is the thick mid-rib of the frond.

Baden, a small town in the canton of Aargau, Switzerland, 14 miles N.W. of Zurich. It has been famous since Roman times (Tac. *H. I.* 67) for its hot mineral springs, still much frequented. Another Baden, the classical *Aqua Cetiæ*, is 12 miles S. of Vienna at the entrance of the Hetmenthal.

Baden, THE GRAND DUCHY OF, a state in the S.W. of Germany, between Bavaria and Hesse Darmstadt on the N. and Switzerland on the S.

Physically it is mountainous and woody, though with plenty of fertile valleys and wider stretches of champaign towards the E. From the bend of the Rhine and Lake Constance to the Neckar extends the Schwarzwald, or Black Forest, of which the portion S. of the river Kinzig has a mean elevation of 3,100 ft., the Feldberg, the highest peak, being 4,780 ft., whilst the N. half averages a thousand feet less. Beyond the Neckar lies the Odenwald with a height of 1,440 ft. Woods chiefly of pine clothe these hillsides from top to bottom, and are a valuable source of revenue. Many streams pour from them to the Rhine and Neckar, supplying water-power. The mineral resources are various but not abundant, though iron, lead, and zinc are worked with profit. Gypsum, china-clay, potter's earth, peat, and salt, are found in considerable quantities. Mineral springs exist in many places and are much esteemed. The manufactures are not extensive, but are being developed. Cotton fabrics, jewellery, and wood carving employ an increasing number of hands. The two universities, Heidelberg and Freiburg (Roman Catholic), enjoy European celebrity. The State owes its origin to the House of Zähringen—a petty fief in the eleventh century that gradually absorbed neighbouring territory, and by the judicious policy of successive dukes became a small power. By the treaties of Luneville (1801) and Pressburg (1805) additions were secured, and on the downfall of the empire in 1806 Baden joined Napoleon's Confederation of the Rhine, the ruler becoming a Grand Duke with fresh accessions of land. After 1815 Baden dexterously re-entered the comity of nations, and was further extended. The Grand Dukes conceded a constitution with two chambers, one elective, the other not, and with certain checks on arbitrary government. These reforms did not prevent the expulsion of the sovereign by Brentano in 1848, but Prussia interfered and he was restored. In 1866 Baden joined the Anti-Prussian party, but offered no strenuous resistance to incorporation with the German Empire in 1870. The form of a separate government is still preserved, though independence is virtually extinct.

Baden-Baden, the name being reduplicated to distinguish it from other Badens, is a town in the Grand Duchy of Baden. It is famous for its thermal springs which were known to the Romans, who called the place *Civitas Aurelia Aquensis*. Distant 18 miles S.W. from Carlsruhe, and 22 miles from Strasburg, it has a lovely site in a rich valley of the Black Forest, and its natural advantages have been enhanced by art, the roads and public gardens being tastefully laid out and the houses picturesquely constructed. The gambling-tables that once drew thither vast crowds of visitors have been suppressed, but the medicinal properties of the waters and the attractions of the locality still render it one of the most popular of German summer resorts. There are ancient ruins in the neighbouring town, an old church, a Jesuit college, and very commodious public buildings of modern date. The Empress Frederick has a country seat near the town.

Badenoch, a district in the Scottish Highlands, lying in the valley of the Spey, and forming the S.E. extremity of Inverness-shire between Athole and the Monahdlead Mountains.

Badge. Though at one time playing so important a part in the science of heraldry and in every-day life, badges stand almost alone in the little that is known about them, and no authoritative rules or laws exist to govern their use. A badge is a matter quite distinct from a crest; neither should a device be confounded with either. The possession of a properly authenticated badge at the present day is a mark of antiquity which but few families possess; and as no fee, however large, can secure a grant or recognition of one of modern date, it is now considered a distinction in no small degree. A crest is never depicted without its accompanying wreath, coronet, or chapeau, a badge is never so displayed, and herein lies the mode of distinguishing the one from the other. Badges were always borne for the purpose of easy identification, and are very often found to bear a "canting" (*i.e.* a "punning") allusion to the names or possessions of the owner. Prior to, and during the reign of, Queen Elizabeth badges were at the height of their favour, and were conspicuously worn by every retainer, originally embroidered upon the back, breast, or sleeve of the livery, and afterwards embossed or engraved upon metal plates, which themselves were affixed to the cap or other garment of the servant; and from this has originated the present custom of carrying the crest upon the livery-buttons. Thus it was at once a patent fact, to all who troubled to note the badge, in whose service a retainer was, for the badges of a district would be well known therein, and many were household words throughout the kingdom. Their frequent and regular use until the end of the sixteenth century can only now be likened to the manner in which the "broad-arrow" is at the present time everywhere to be seen, marking Government property. But as an example, showing how a retainer would in the olden time wear the badge of his lord, the uniform of the Beefeaters, at the Tower of London, may be instanced. The White and the Red Roses of York and Lancaster were badges, as are the Rose, the Thistle, the Shamrock, and the Leek of to-day; and amongst others which are well known may be mentioned the "bear and the ragged staff" of the "king-maker," the "talbot" of the Talbots, the "knots" of the Wakes and Bourchiers, and the heart, regally crowned, of Douglas.

Badger, the popular name of any species of the genus *Meles* of the Arctoid family *Mustelidæ* (q.v.). The carnassial tooth has a cutting edge, and the lower jaw is articulated to the upper by means of a transverse condyle, which locks firmly into a long cavity of the skull, enabling these animals to maintain their hold with the utmost tenacity, and rendering dislocation of the jaw practically impossible. The best known species is *Meles taxus*, the common European Badger, indigenous in Britain, and the largest native carnivore. From the snout to the extremity of the tail the length is rather under three feet; the head is long and pointed, the body flat, and increasing in breadth towards the hind-quarters, the legs so short that the long coarse hair trails on the ground as the animal

walks, and the tail very short. The head is white, except a black band on each side, the upper surface and tail grey, and the under surface and legs black. There is an anal pouch which secretes an oily substance of offensive odour. The Badger is a nocturnal burrowing animal, feeding on roots, fruit, eggs, and small mammals and reptiles, and choosing the most solitary woods for its earth, which has several chambers, and ends in a round hole well lined with dried grass. It is extremely shy and inoffensive, but if attacked will defend itself stubbornly, biting fiercely and, from the peculiar conformation of the jaws, holding on tenaciously.

BADGER (*Meles taxus*).

It undergoes a partial hibernation, Badger-baiting, or putting a badger into a cask open at one end and laid on its side, and setting dogs to draw the poor beast out, was formerly a popular English sport. It is now illegal, but has left traces in the language in the verb "to badger"—to worry. *M. leucurus*, *M. chinensis*, and *M. anakuma* are closely allied Asiatic species. The American Badger (*Taxidea americana*) was formerly included in the same genus, with the name *M. labradorica*. It is rather smaller than the European species and more decidedly carnivorous in habit. Badgers are chiefly valued for their hair, that of the common badger being used for making shaving brushes; that of the American species is used for the same purpose and also for artists' brushes.

Badger-dog, a translation of the German Dachshund (q.v.); sometimes applied to terriers used in driving badgers from their earths.

Badia y Lablich, DOMINGO, born at Biscay, Spain, in 1766, after a course of special study travelled in Mohammedan disguise as Ali Bey, visiting Egypt, Tripoli, Syria, Arabia, and other oriental countries. In 1807 he took service under Napoleon, in the Peninsula, and on the expulsion of the French fled to Paris, where he published his travels. He was sent out to Syria as a French agent, and died at Aleppo, perhaps of poison, in 1818.

Badminton, the seat of the Duke of Beaufort, near Yate, in Gloucestershire, has given its name to a kind of claret cup, and to a game resembling lawn tennis and a year or two earlier in its origin, in which a shuttlecock is used instead of a ball.

Badrinath, a small town on the side of a mountain of the same name in the district of Gahrwal, North-West Provinces of British India. It contains a famous Hindu shrine dedicated to one of the incarnations of Vishnu. This encloses an idol of black stone, to worship which several thousand pilgrims come yearly, and at the decennial festival of Kumb Mehla this number is largely increased.

Baedeker, KARL, the founder of the well-known series of Continental guides that now rival the publications for which John Murray once had a monopoly, was born at Essen in 1801. His father was engaged in the printing trade, and the son following in his footsteps established himself at Coblentz in 1827. There he produced some ten years later his *Guide to the Rhine*, giving, as the result of personal observation, details of practical value to travellers of modest means. From this beginning started the enterprise that has now dealt with almost every country in Europe, and found expression in the principal European languages. Karl Baedeker died in 1859.

Baen, or BAENA (classic *Baniana*), a town in the province of Cordova, Spain, 12 miles S.E. of that city, on the river Marbello. There are many Roman remains, including a mortuary vault of the Pompeian family.

Baer, CARL ERNST VON, the greatest of modern embryologists, was born in 1792 in Esthonia, and was educated at Dorpat and Würzburg. He was fifteen years professor in the university of Königsberg, and then for nearly thirty in that of St. Petersburg, retiring in 1864. He died in 1876. In 1827 Baer discovered the mammalian ovum; and in his great work on the development of animals, of which the first part appeared in 1829 and the second in 1838, he showed the developmental basis of Cuvier's division of animals into Radiata, Articulata, Mollusca, and Vertebrata; traced in detail the development of the chicken in the egg; and laid down the law, now known by his name, that a developing embryo resembles in succession those of successively higher types. This is now known as the parallelism of ontogeny and phylogeny. [BIOLOGY.] Baer recognised that this law of specialisation was of general application throughout Nature.

Baetyl. [CIPPUS, STONE-WORSHIP.]

Baeza (anc. *Beatia*), a town in the province of Jaen, Spain, situated on an eminence three miles from the river Guadalquivir. Under the Moors it was the capital of a kingdom and strongly fortified, some of the old gates and walls still remaining, but it was sacked and ruined in 1238.

Baffin, WILLIAM, was born at Southport in 1584, but not much is known of his parentage or early life. In 1612 he made a voyage to the North-West, and in the account of it which he published gave a useful method of determining longitude by astronomical observations. In 1613 he went to the Greenland fisheries, and in the two following years went as pilot to Bylot in the *Discovery*, in search of the North-West Passage. He reached Lancaster and

Smith Sounds and the bay that bears his name. His narrative, preserved in the British Museum, has been published by the Hakluyt Society. He then seems to have visited Eastern seas, and in 1621 was killed at Kismis, a small fort near Ormuz in the Persian Gulf, whilst engaged in attacking the Portuguese.

Baffin's Bay, or SEA, a wide strait or inlet separating the N.E. coast of N. America from Greenland. It was discovered by Baffin (q.v.), and is approached from the Atlantic by Davis's Strait, whilst Lancaster Sound and Barrow's Strait connect it with the Arctic Ocean. It is open only for two months of the year, and is then much frequented for whale and seal fishery. The Danes have settlements on Disco Island to the E., and Whale Island to the N.

Bagatelle (Fr. *bagatelle*, a trifle), a game somewhat resembling billiards, played by two or more persons with nine small ivory balls and a cue or mace, on a board, one-half of which contains nine numbered holes. The player's object is to put the balls into these. The game may be connected with the old English shovel-board.

Bagdad, or BAGHDAD, a pashalic of Asiatic Turkey, with a capital of the same name. The district lies between the river Euphrates, Persia, and Arabia, comprising the ancient Assyria and Babylonia. The parts enclosed between the Euphrates and Tigris are very fertile, but the rest of the country is a sandy waste. Cereals and fruits of every description are produced in the less sterile regions. The city of Bagdad is on the Tigris about 200 miles above its junction with the Euphrates in the midst of a barren plain. The ancient quarter, once the capital of the Caliphs, is on the W. bank of the river, and contains some remains of former splendour in the form of mosques and palaces, with a venerable burial place where the tomb of Zobeide, Haroun Alraschid's wife, is shown, and tradition asserts that Ezekiel is interred there. The markets are still busy and prosperous, and there is a considerable trade with Aleppo, Damascus, and Basra. The East India Company had a resident here, whose place is now filled by a consul-general. The streets are dirty and narrow, and their sanitary condition renders the town liable to epidemics.

Bagehot, WALTER, was born at Langport, Somersetshire, in 1826, and educated at University College, London, under Professors De Morgan and Long, taking a high degree at the London University. Though called to the bar in 1855 he took to his father's banking business, and devoted his leisure to writing on financial and political subjects. He contributed to the *National Review* (not the publication now bearing that name), and helped to edit it, and for the last seventeen years of his life was editor of *The Economist*, which was founded by his father-in-law, the Right Hon. James Wilson. His chief works are *Lombard Street, The English Constitution, Physics and Politics, Treatise on Depreciation of Silver*, and *Essays on Parliamentary Reform*. His style is bright and vigorous, and his political views are generally original and striking. In economic science he followed Ricardo without sacrificing his independence. He died in 1877.

Baggara, or BAKKARA, *i.e. cowherds*, a large nomad Arab nation of Egyptian Sudan, mainly along the left bank of the White Nile, towards the south frontier of Kordofan; chief tribal divisions: Selim, Hunir, Hawâ, Hawasm, and Hamâr.

Baggesen, JENS EMMANUEL, born at Korsör, Denmark, in 1765, spent some years in roaming over France, Italy, Switzerland, and Germany, married a daughter of Haller, and was appointed professor in the University of Kiel. As a writer of light verse and of travels, both in Danish and German, he won much popularity, the best known of his books being *Haidenblumen, Adam and Eve, The Labyrinth*, and *Travels in the Alps*. His irritability and egotism, however, earned him many enmities. His death occurred in 1826.

Baghelkand, a district comprising the five native states of Rewah, Nagode, Maihar, Sohawal, and Kothi, under the political superintendence of the agent for Central India. Their total area is 11,324 square miles, and they all lie to the S. of Mirzapore and Allahabad. Rewah is the largest and most prosperous, being traversed, as is Nagode, by the East India Railway. The agent's residence is in the chief town, Rewah, 131 miles S.W. of Allahabad.

Bagheria, or BAGARIA, a town in Sicily, eight miles from Palermo, to which it serves as a *villegiatura*, many of the wealthy citizens having residences there. It is situated between the bays of Palermo and Termini, and is connected with the capital by a railway.

Baghermi, or BAGIRMI, a Mohammedan kingdom in Central Africa, lat. 8° to 12° N., long. 15° to 17° E. It lies S.E. of Lake Tchad, and extends about 240 miles from N. to S., and 150 from E. to W. The capital is Maseña, and here Dr. Barth passed some time as a prisoner.

Baghtsche-serai, or BAKTSHI-SERAI, a Tartar town which was once the capital of the Crimea, Russia. It is about 10 miles S.W. of Simferopol, and besides many mosques and fountains contains the old palace of Khan-serai. Turkish saddles and silk are the chief manufactures.

Baglivi, GIORGIO, born at Ragusa in 1668, studied medicine and anatomy under Valsalva and Malpighi, and was appointed professor at the Sapientia College, Rome. He did much to put physiology on a rational basis. He died in 1707.

Bagne (Ital. *bagno*, bath; the term was first used for a prison in or near a bath at Constantinople), the French term for a convict prison. Introduced instead of the galleys (q.v.) at the Revolution, their use is now superseded by transportation (adopted 1851), usually to New Caledonia. The last were at Toulon, Rochefort, and Brest. A few "cellular prisons" for convicts exist in France; there is a penal settlement in Corsica, and a depôt at the Ile de Ré for those awaiting transportation.

Bagnères-de-Bigorre, or EN BIGORRE (classic *Aqua Convenarum* or *Bigerrorum*), a town

on the river Adour in the department of Hautes Pyrénées, France, 13 miles S.E. of Tarbes. The mineral springs are numerous and of high repute for nervous affections and chronic catarrh. The fine woollen tissue known as barège is woven here.

Bagnères - de - Luchon (anc. *Balneareæ Lixiones*), a town in the charming valley of Luchon, department of Haute Garonne, France, 4 miles from the Spanish frontier. Its waters, of various temperatures and impregnated with sulphur and other chemical substances, attract many summer visitors, and the Spaniards flock thither for amusement. It is a well-built town with excellent hotels.

Bagno a Ripoli, a village situated 5 miles from Florence, Italy. The thermal springs cause it to be much frequented, and many handsome villas have sprung up in the vicinity.

Bagnols, a town in the department of the Gard, France, 26 miles from Nimes. Silks and serges are manufactured here; the district yields excellent red wine. It is the birth-place of Rivarol.

Bagomoyo, a mission station on the E. coast of Africa, opposite Zanzibar island, and a common place of departure for the interior. Lat. 6° 17′ S.

Bagpipe, a musical instrument of high antiquity, common in certain varied forms to many European and Asiatic nations, especially among those of Celtic origin.

Its British form consists of a leathern bag, formed of the skin of a kid or other small animal, which retains the wind with which it is inflated by the mouth of the player. There are three pipes, two of which form the drone, and only produce the key-note and its fifth; the third, called the "chanter," is furnished with a reed, and is bored with holes which are stopped by the fingers of the player when the tune is produced. The compass is only nine notes in extent. The bagpipe originally came from the East. It is supposed that the word "symphony" mentioned in the marginal reference in the Bible (Dan. iii. 7) refers to the bagpipe.

The popularity of the instrument among the English in mediæval times is proved not only by the frequent mention of it in contemporary MSS. and the early poets, but its influence is shown also in the character of some of the melodies of undoubted antiquity which have survived; some of which are mentioned by Mr. W. Chappell in his *Popular Music*. The bagpipe is usually considered in Great Britain as the national Scottish instrument, and some writers have asserted that Bruce's march, "Hey tuttie, taitie," a melody more familiar through the words "Scots wha hae," by Burns, was the identical tune played on the bagpipes at the battle of Bannockburn, 1314. Barbour, the chronicler of the event, makes no allusion to this. The earliest mention of the bagpipe as a military instrument among the Scots was at the battle of Balmines in 1594.

The Irish pipes are generally called the "Union" pipes, a word corrupted of the term "Ullan," which means the elbow; the Irish pipes being inflated by a bellows worked by the elbow of the performer. There are three drones in the old Irish pipes, two tuned in unison, and the third an octave below. Many pipes are provided with valves to shut off the drone if required, and some have a contrivance by means of which the common chord of the key in which the pipes are set may be sounded at will to help the effect. The tone of the Irish pipes is softer and sweeter than the Scottish pipes, which are of a more piercing and stimulating tone. The Musette, popular in France at the end of the 17th and the beginning of the 18th centuries, was a sort of "parlour bagpipe," sweet and delicate in tone. It was often adorned in artistic style, and the bag enclosed in richly embroidered covers.

Bagration, Peter Ivanovitch, Prince, a Russian General, was born in 1765, and, after serving under Potemkin, accompanied Suwarrow into Poland (1794) and Italy (1799), where he so distinguished himself that Suwarrow called him his "right arm." At Marengo, Novi, and the capture of Brescia, Turin, and Alexandria, he played a conspicuous part. Disgraced for a while by Paul, he returned to the army in 1805 and commanded the vanguard at Austerlitz, Eylau, and Friedland. He next served in Finland and in Turkey. During Napoleon's invasion of Moscow he was at the head of the Western Army, made a brilliant retreat to Smolensk, and was killed in 1812.

Bagshot Sands, a series of sands of Middle and Upper Eocene age [Eocene], named from Bagshot Heath in north-west Surrey, where they cover a large area. They are variously coloured and generally unfossiliferous, but include bands of clay and lignite, which contain tapir-like animals, turtles, crocodiles, sea-snakes, sharks, numerous marine shells, and land plants indicating tropical conditions. They form three divisions: the Lower, 100 to 150 feet thick in the London basin, 660 feet in the Isle of Wight, and at Bournemouth and Studland; the Middle, less than 100 feet in the London basin, and represented by the thicker fossiliferous Bracklesham beds in Sussex, Hants, and Dorset; and the Upper, over 100 feet thick in the London area, but represented by the Barton Clay, 300 feet thick, in Hampshire.

Bahamas, The, or Lucayo Islands, lie off the coast of Florida, in the Atlantic Ocean (lat. 22° to 28° N., and long. 73° to 79° W.), and belong to Great Britain. They consist of 29 islands and 3,048 "cays" or rocks, and serve as stepping-stones, so to speak, between the West Indian Islands and North America. The total area is about 5,000 square miles. Nearly all of the ground is low-lying and narrow. The soil in most cases is exuberantly fertile, and the climate good, but only twenty of the group are inhabited. New Providence contains the capital, Nassau, which was a great resort for blockade runners during the American War of Secession. San Salvador was the first land visited by Columbus in 1492. The Spaniards in the next century carried off all the natives to work as slaves in the mines, and left the islands depopulated. In 1578 Sir Humphrey Gilbert annexed them, and in 1680 Charles II.

granted them to the Duke of Albemarle and others, but the Spaniards put a stop to colonisation, and for many years they became the haunts of buccaneers and pirates. It was not till 1783 that a firm government was established, consisting of an English governor, a legislative council, and representative assembly. The products are pine-apples, sponges, and drugs, but the negroes, who form two-thirds of the population, are averse to settled industry.

Bahawulpoor, or BHAWALPUR, a feudatory state of N.W. India, under the political jurisdiction of the lieutenant-governor of the Punjab. It occupies an area of 22,000 square miles, stretching along the Upper Indus, Chenab, and Ghara rivers, which form its N.W. boundary, and having Rajputana on the S.E. Five-sixths of the soil is sandy and barren, but the strip near the river banks is very fertile. The capital, Bhawalpur, is on the Ghara, about 60 miles above its junction with the Chenab.

Bahia, the name given by Spanish or Portuguese explorers to bays in different parts of the globe.

Bahia, a province on the S.E. coast of Brazil, extending from the Rio Grande do Belmont to the Rio Real, and bounded inland by a range of mountains at an average distance of 200 miles from the sea. Of the total area (202,272 square miles) much is covered by forests, but the cultivated districts yield rich crops of cotton, coffee, sugar, tobacco, maize and fruits. Coal has been found, and mines of diamonds and other precious stones exist. Bahia, or San Salvador, the capital of the province, is a fine city standing partly on a height, the Praya commanding a view of the Bay of All Saints. It was founded in 1549, and until 1763 was the capital of the empire. Two-thirds of the population are mulattoes or blacks. It is a very important commercial port. The cathedral, the palaces of the governor and archbishop, and the other public buildings are spacious and handsome.

Bahr (Arab. *water* or *river*), a prefix in many geographical names wherever Arab influence has prevailed. Bahr-el-Abiad is the White Nile; Bahr-el-Azrek, the Blue Nile; Bahr-bela-Ma (*sea without water*), the arid valley 50 miles from Cairo on the confines of the Libyan desert; Bahr-el-Fars, the Persian Gulf; Bahr Loot, the Dead Sea; Bar-el-Ghazel, etc. The form Bahret is sometimes found.

Bahraich, or BHARAICH, a district of British India, S. of Nepaul, under the jurisdiction of the Chief Commissioner of Oudh. It has an area of 2,308 square miles. It lies between the Rapti and the E. Gogari rivers, and a great plateau occupies the centre. The capital, Bharaich, is on the latter river. Hindus form the bulk of the population.

Bahrdt, KARL FRIEDRICH, was born at Bischoswerda in 1741, and early attracted attention by his theological opinions, which inclined to Socinianism, if not to simple Deism. He began to teach at Leipsic, became professor of Biblical antiquities at Erfurt, was expelled for his heretical and revolutionary ideas and his aggressive temper, and settled at Halle. His political pamphlets got him into trouble, and he gave up lecturing for the trade of tavern-keeper, dying in 1792.

Bahrein, a group of islands belonging to Muscat, on the S.W. of the Persian Gulf, near the Arabian coast. The chief of them, which gives its name to the whole, is Bahrein or Awal (Aval), and lies about 90 miles from Bushire, having a length of 70 and a breadth of 23 miles. The pearl fisheries are the richest in the world. Tortoise-shell, sharks' fins, and dates are also exported, and the soil produces cereals and fruits. Manama is the capital, and Arad, Maharay, and Tamehoy are the other principal islands of the cluster.

Baiæ, or BAJA, a small coast town in Campania, Italy, between Cumæ and Puteoli. The warm baths, salubrious climate, and pleasant neighbourhood made it a favourite resort of wealthy Romans; it is frequently referred to by Horace. The place was supposed to have been founded by one of the followers of Ulysses. It has long since succumbed to encroachments of the sea, but ruins of the handsome villas built there in its palmy days still exist.

Baias, BYAS, or PAYAS, a town in Asiatic Turkey on the E. coast of the Gulf of Scanderoon, in the villayet of Aleppo. The ruins near it are those of the ancient Issus, and the neighbouring river perhaps bore that name, and on its banks was fought the battle in which Alexander defeated Darius Codomannus in 333 B.C. There is a poor harbour and a Turkish castle.

Baibout, or BAIBURT, a town of Turkish Armenia, on the river Chorok, 65 miles N.N.W. of Erzeroum. It was in the Middle Ages occupied for some time by the Genoese.

Baidyabati, a town in Bengal, British India, on the river Hooghly and the East Indian Railway, 15 miles from Calcutta. It is principally inhabited by Hindus, who are engaged in the jute trade, one of the largest markets in that commodity being held here twice a week.

Baikal, a large fresh-water lake in the government of Irkutsk, Siberia, Asiatic Russia (lat. 53° N., long. 108° E.). Its greatest length from S.W. to N.E. is 397 miles, and it varies in breadth from 13 to 54 miles. Lying in the midst of the Baikal range, an offshoot of the Altai system, it has very precipitous shores. Its water is remarkably clear and deep, and fish are plentiful, especially sturgeon, sterlet, and salmon. Numerous rivers flow into the lake, but the only outlet is the Lower Agara, a tributary of the Yenesei, which issues from the lower extremity near the town of Irkutsk. There are several islands, the largest, Olkhon, being 32 miles long by 10 miles broad. Though dangerous, like all mountain lakes, it is navigated in summer, and forms an important link in the communication between Russia and China, and also between the adjacent districts. In winter, which lasts for eight months, it is frozen over so as to admit of traffic over the ice.

Baikie, WILLIAM BALFOUR, born at Kirkwall in 1824, took the degree of M.D. at Edinburgh, and entered the Royal Navy. In 1854 he was attached to the Niger Expedition, to the command of which he ultimately succeeded. He explored the river for a distance of 250 miles. In 1857 he established a mission station, where he lived for some years

doing excellent work, collecting valuable vocabularies, and translating parts of the Bible and Prayer-book into African dialects. His health at last broke down, and he died at Sierra Leone in 1862.

Bail, the security given by one who is arrested for his appearance to answer the charge—derived from *bailler*, to hand over, because the accused is delivered into the hands of those who make themselves responsible for him; and who may, if they suspect him of an intended flight, have him imprisoned. Formerly any plaintiff might, on making an affidavit as to the cause of action, call upon the defendant to find bail for his appearance; but this hardship has been generally abolished, and the necessity for bail only retained in a few civil cases, of which the most important are that under the Debtors' Act of 1869, of a defendant intending to leave England; in cases where a defendant is arrested on writ of attachment; on arrest in the Chancery Division, where a defendant is intending to leave England. In Admiralty actions the defendant may have the ship or other property which has been arrested, released on his procuring bail for its value; the instrument executed for this purpose is known as the "Bail Bond."

The most familiar cases of bail are those in criminal proceedings. In cases of misdemeanor the justices must, and in cases of felony other than treason they may, admit to bail. In the excepted case bail may be accepted by order of the Secretary of State, by the Court of King's Bench, or by any judge in time of vacation. Bail in error is bail given by a defendant or prisoner during the pendency of a writ of error. In Foreign Attachment giving bail is one of the ways by which the attachment may be dissolved. [FOREIGN ATTACHMENT.]

Recognisances are said to be estreated when the accused fails to comply with their condition, as by non-appearance or otherwise. [ESCHEAT.]

In the United States the practice is very similar to the above. In Scotland there are certain fixed amounts of bail for different degrees of persons under several statutes, the principal one being the 39 Geo. III. c. 49 (1799).

Bailee, BAILMENT, BAILOR. Bailment is a contract entered into by which goods are delivered by one person (termed the bailor) to the other (termed the bailee) upon an express or implied undertaking by the latter to return them to the former, or to deliver them to some other person appointed by him after the purpose has been fulfilled. The bailee is legally bound to take care of the goods while in his possession. The amount of care to be thus taken is often expressly fixed by the contract, but where the contract is silent on this point the following rules, which are based on the presumable intention of the parties, are applicable according to the circumstances of the particular case.

1. Where the bailment is for the benefit of the bailor alone, the bailee is liable only for gross negligence.

2. Where the bailment is for the benefit of the bailee alone, he is bound to use the strictest diligence and care.

3. Where it is for the benefit of both bailor and bailee the bailee is only bound to use ordinary average diligence and care.

The practice of bailment is known in the United States, and the above illustrations of it are also applicable there.

Bailey, PHILIP JAMES, born at Nottingham in 1816, was educated for the law at Glasgow University. He took, however, to poetry, and 1839 startled the world by publishing *Festus*, a non-acting drama, constructed on lines similar to those of Goethe's *Faust*, and containing, amidst much that was extravagant and absurd, many passages of originality and beauty. His later works, *The Angel World*, *The Mystic*, *The Age*, or *The Universal Hymn*, were warmly welcomed. He died in 1902.

Bailey, SAMUEL, born at Sheffield in 1787, and known therefore as "Bailey of Sheffield," devoted himself from his youth to ethical speculations, and in 1820 produced his essays *On the Formation and Publication of Opinions*. These were followed by *Essays on the Pursuit of Truth and Progress of Knowledge*, and a work on *The Theory of Reasoning*. In later life he wrote on political economy and Shakesperian criticism. He adopted the Utilitarian system of morals, the "Common Sense" theory of psychology, and advocated perfect freedom of inquiry. At his death in 1870 he left most of his large fortune acquired in business to his native town.

Bailiff, a keeper or superintendent. There are several kinds of bailiffs, as bailiffs of liberties, sheriff's bailiffs, bailiffs of lords of manor, etc. Sheriffs are also termed the King's bailiffs, and they are bound to preserve the rights of the Crown in their respective bailiwicks, a word introduced by the Norman princes in imitation of the French, whose territory was divided out into bailiwicks (which is analogous to counties of England). The word bailiff, however, usually designates sheriff's officers, who are either (1) bailiffs of hundreds, who are officers appointed over those respective districts by the sheriffs to collect fines therein, to summon juries, to attend the judges and justices at the Assizes or Quarter Sessions, and also to execute writs and processes in the several hundreds. (2) Special bailiffs are that lower class of persons employed by the sheriffs for the express purpose of serving writs, making arrests, and levying executions, etc. (3) Those persons who have the custody of the king's castles are also often called bailiffs, as the bailiff of Dover Castle. (4) The chief magistrates of some particular towns and places are also often termed bailiffs, as "the bailiff of Westminster." There are also bailiffs of the county courts (termed high bailiffs, who, by their sub-bailiffs, execute the process of the court), bailiffs of courts farm, bailiffs of the forests, etc. The word is also used as applied to one who manages a farm.

In the United States the term is not so much in use, but where used it signifies a sheriff's deputy or constable, or some one liable to account to others for the rents and proceeds of an estate. The duties are performed by a deputy, who acts under the orders of the sheriff or magistrate.

Bailiwick, strictly the county or district within which the sheriff or bailiff of the king may exercise jurisdiction. English writers often use the term to translate *bailliage* or *vogtei*, the French and German terms for districts in which justice was administered by an officer appointed by the king or emperor as his deputy.

Baillie, JOANNA, born at Bothwell in Lanarkshire, in 1762, where her father, professor of divinity at Glasgow, was minister, her mother being the sister of William and John Hunter. At her father's death in 1784 she joined her brother Matthew, an eminent physician in London, and after 1800 passed the rest of her life at Hampstead. In 1798 she published the first series of her *Plays of the Passions*, the second following in 1802. Her dramas at once attracted notice, and were attributed to Sir Walter Scott. John Kemble produced *De Montfort* at Drury Lane without much success. During the next thirty years she wrote several volumes of tragedies and comedies, a few of which were acted, but only one, *The Family Legend*, ever attained any degree of popularity. They are deficient in plot, unreal in character, and full of false sentiment. Yet there are occasional glimpses of genuine life, and touches of poetic feeling, whilst a vein of simple humour frequently runs through the dialogues. She composed some songs of merit and several metrical legends in the style of Scott, who was one of her warmest admirers. She died in 1851.

Baillie, MATTHEW, M.D., the brother of Joanna, was born in 1761, and studied for the medical profession under William Hunter, who left him his museum, house, and library. For some years he held a distinguished position as a teacher, but did not get much practice. In 1795 he published his great treatise on morbid anatomy; his reputation soon attracted clients, among whom were George III., and the Princesses Amelia and Charlotte. He was physician to St. George's Hospital, and President of the Royal College of Physicians. He died in 1823.

Baillie, ROBERT, of Jerviswood, belonged to the family of the Baillies of Lamington, Lanarkshire. He took an active part in the support of Presbyterianism, and in 1676 was tried for a tumult against the Government owing to his attempt to procure the release of his brother-in-law imprisoned by Archbishop Sharpe. Though condemned he was speedily released in order to avoid popular indignation. He then resided in London, and was arrested in 1683 for complicity in the Rye House Plot. After an unfair trial in Edinburgh he was sentenced to death, and as ill-health and age threatened to cheat the gallows of a victim, he was hanged on the same day.

Baillie, ROBERT, born at Glasgow in 1602, entered Episcopalian orders, and became regent of the University. He joined the Covenanters when Laud endeavoured to force his canons and services on the Scottish Church, and he went to London in 1640 to urge the charges against the Archbishop. At the same time he was a staunch adherent of the king's party, and after the Restoration in 1661 was Principal of Glasgow University, a post for which he was fitted by his sound learning. He died in 1662.

Bailly, JEAN SYLVAIN, born at Paris in 1736, evinced as a youth great aptitude for astronomical pursuits, to which he devoted his best years, completing in 1779 his *History of Astronomy*. At the outbreak of the Revolution he appeared as a staunch advocate of liberty and was chosen first president of the National Assembly. However, his views were those of the Girondins, and his tone of moderation towards the royal family made him unpopular. As Mayor of Paris in 1791 he gave the orders that resulted in the massacre of the Champs de Mars. Henceforward he was execrated and had to fly for his life. He was apprehended and sent to the guillotine in 1793. As he mounted the scaffold one of the bystanders cried, "You tremble, Bailly." "My friend," he replied, "it is with the cold."

Bailment. [BAILEE.]

Baily, EDWARD HODGES, R.A., born in 1788 at Bristol, where he entered a merchant's office, but displaying a talent for carving and modelling, was taken by Flaxman into his studio (1807). He also worked at the schools of the Royal Academy, and won the gold medal in 1811 for his *Hercules rescuing Alcestis*. In 1817, being elected A.R.A., he exhibited *Eve at the Fountain*, which established his reputation. He became R.A. four years later. Few of his best works reveal Flaxman's classical influence. His genius lay in dealing with familiar and domestic conceptions, and his most popular creations were entitled *Mother and Child, A Group of Children, The Sleeping Girl, Eve listening to the Voice*, etc. The statues of C. J. Fox and Lord Mansfield in St. Stephen's Hall are from his chisel, and many of his monumental efforts are to be seen at St. Paul's and elsewhere. He died in 1867.

Baily's Beads. [ECLIPSE.]

Bain, ALEXANDER, LL.D., born at Aberdeen in 1818, and educated there at the Marischal College and University, where he distinguished himself in mental, moral, and natural philosophy, being appointed in 1845 professor of the last at Glasgow. Two years later he came to London, and was assistant secretary to the General Board of Health, whilst from 1860 to 1880 he held the Chair of Logic at Aberdeen. He early began to write in the *Westminster Review*, and was closely allied with John Stuart Mill. In 1855 he brought out *The Senses and the Intellect*, his first attempt at an original analysis of the phenomena of the human mind, based on physiology. This was followed by *The Emotions and the Will*, the two together constituting a complete exposition of his theory of psychology. *The Study of Character* appeared in 1861, and then Dr. Bain devoted several works to the English language as an instrument for the correct expression of scientific thought. In later years his chief productions were compendia for the use of students, but he assisted in editing James Mill's *Analysis of the Human Mind*, Grote's *Aristotle* and *Minor Works*, and a condensation of Grote's *Plato*. He also published biographical sketches of James and John Stuart Mill. He died in 1903.

Bairaktar, or BEIRAKDAR, MUSTAPHA, PACHA, born in 1755, distinguished himself in the Turkish

army and in 1806, as pacha of Rustchuk, opposed the invasion of the Russians, who had seized Bucharest. At this juncture the Janissaries rose against Selim III., and put in his place Mustapha IV., who strangled Selim. Bairaktar, concluding a hasty armistice with Russia, marched to Constantinople, deposed and strangled Mustapha (1808), and set up Mahmoud II. He died in the same year.

Bairam, the Persian and Turkish name for a Mohammedan festival somewhat analogous to our Easter, immediately following the fast of Ramadan and lasting three days. Seventy days afterwards the *Second Bairam* is celebrated, in commemoration of the sacrifice of Isaac. The Mohammedan year being *lunar* (354 days), the festivals run through all the seasons in 33 years.

Baird, DAVID, SIR, BART., K.C.B., born at Newbyth, Haddingtonshire, in 1757, at the age of fifteen entered the army, and in 1779, as a captain, went out to India in the 73rd Highlanders. He was wounded in Baillie's disastrous defeat, taken prisoner by Hyder Ali, and shut up for four years in Seringapatam. On his release he went home, but again returned to India in 1791, assisting in the capture of Pondicherry in 1793. Six years later he was sent to the Cape, but in 1799, with the rank of brigadier-general, appeared once more in Madras to act under General, afterwards Lord, Harris, against Tippoo Sahib. At his request the storming of Seringapatam was entrusted to him, and most gallantly did he perform the task, but his disappointment was keen when the governorship of the town was handed over to Colonel Arthur Wellesley, his subordinate. Baird served in the expedition to Egypt *viâ* the Red Sea (1801–2), when Rosetta and Alexandria were taken; he acted against Scindiah in 1803-4, and captured Cape Town from the Dutch in 1805. He next took part in Cathcart's capture of Copenhagen in 1807, and in 1808 was second in command at the battle of Corunna, where he lost his arm but gained a baronetcy. In 1820 he held for a short time the chief command in Ireland, but was not successful. Retiring from active employment, he died in 1829.

Baird, SPENCER FULLERTON, born at Reading, Pennsylvania, U.S.A., in 1823, received a scientific training at Dickinson College, and became professor of natural science there in 1846. In 1850 he was transferred to the Smithsonian Institution at Washington, of which he ultimately became secretary. In this capacity he for many years directed the vast scientific operations of the Institute, and managed the National Museum, now one of the most important in existence. Among his best known works are *A Report on the Mammals of North America, Report on Fish and Fisheries*, which has led to a successful system of pisciculture, the *Annual Report of the Smithsonian Institution* and of the *Philadelphia Academy of Natural Sciences*, besides many minor contributions to the literature of natural history. He died in 1887.

Baireuth, or BAYREUTH, a principality or margraveship in Bavaria, which, after having preserved a more or less independent existence since 1248 A.D., was in 1769 incorporated with Anspach (q.v.), sold to Prussia in 1801, surrendered to France in 1807, and ceded to Bavaria in 1810. The capital, *Baireuth*, is now the chief town of Upper Franconia. It has an open and pleasant site, with good wide streets, and fine public gardens. The Stadt-Kirche dates from the 15th century, as does one of the old castles. The Sophienberg, or palace of the margraves, was rebuilt after a fire in 1753. There is an excellent opera house, but the chief interest of the place in late years centres on the large theatre erected by the King of Bavaria for the production of Wagner's musical masterpieces. A monument has been set up to Jean Paul Richter, who died here in 1825. Some trade is carried on in cotton and woollen goods, leather, parchment, and tobacco.

Baireuth, SOPHIA WILHELMINA, MARGRAVINE OF, born in 1709, sister of Frederick the Great of Prussia, and mother of the well-known Margrave of Anspach, who married Lady Craven. She was a woman of literary ability, her correspondence with her brother and her *Memoirs* throwing much light on the events and manners of her time.

Baitool, a town and district in the Saugor territory of North-West Provinces of British India. The town is situated on a tributary of the river Nerbudda, and is fortified. The area of the district is 900 square miles.

Baize (Fr. *baies*), a coarse woollen cloth with a long nap, chiefly used for coverings, curtains, etc., and in some countries for clothing.

Baja, a market town on left bank of the Danube, and in the circle of Bacs, Hungary, 90 miles S. of Buda-Pesth. It is celebrated for its fairs held four times a year, when a large business is done in grain and pigs. There are several churches, a handsome castle, and a gymnasium. Two other towns of the same name are in Little Wallachia, and a third on the N.W. coast of Cuba.

Bajada de Santa Fé, better known now as Parana, is the capital of the department of Entre Rios, in the Argentine Confederation, South America. It is on the E. bank of the river Parana, Santa Fé being opposite to it.

Bajazet I., or BAYAZID, born in 1347, succeeded his father, Amurath I., in 1389, as Sultan of the Ottoman Turks, when he forthwith put to death his only brother Yakub. His life was spent in vigorous efforts to reduce the few independent states in Asia Minor, and to push the conquests of the Mussulmans in Europe. He was successful in both quarters. Before 1393 he had reduced nearly all the East as far as Erzeroum and the Euphrates, and in that year he practically got into his power the Greek Emperor of Constantinople. In 1396 he crushed near Nicopolis a great army of Crusaders under Sigismund, King of Hungary, and extended his dominions to the Morea. He now came into contact in the East with Timur, or Tamerlane, the Mongolian conqueror. Their forces met (1401) in the plain of Angora, and Bajazet was utterly defeated, taken prisoner, and, according to some, humanely treated; but the more popular story

represents him to have been shut up in a cage and carried about by his oppressor till he died in 1403.

Bajazet II., the son of Mahomed II., succeeded his father in 1481, having first defeated his brother, Zizim. He failed in suppressing the Mamelukes in Egypt, but he won territory from the Moldavians, Bosnians, and Croats. His two wars with Venice ended rather in favour of the Republic, and Shah Ismael of Persia somewhat encroached on his eastern borders. Selim, his youngest son, compelled his father to abdicate in his favour in 1512, and, it is said, poisoned him soon after.

Bajazet, whose fate supplied the plot for one of Racine's finest tragedies, was the younger brother of Amurath IV., who put him to death in spite of the entreaties of their mother in 1635.

Bajocco, a small copper coin, once in use in the Papal States, worth about a halfpenny.

Bajus, or DE BAY, MICHAEL, born at Melin, Hainault, in 1513, was educated at the University of Louvain, where he became professor of theology, and ultimately Chancellor. He was present at the Council of Trent, and incurred the hostility of the Jesuits by propounding the doctrines of Augustine in opposition to the orthodox scholastic theology. His views were condemned by two popes, and he made a nominal submission, but the Jansenists reasserted his teaching a little later. Bajus retained his post at Louvain, and died in 1589.

Bajza, JOSEPH, born at Szüesi, Hungary, in 1804, adopted the profession of journalism, and edited from 1830 to 1837 Kisfaludy's *Aurora*, to which his first poems were contributed. He wrote in various journals on a variety of topics, especially the drama, and he compiled the *Historical Library*, *Modern Plutarch*, and *Universal History*. Adopting revolutionary principles, he was editor in 1848 of Kossuth's paper, but his last years were rendered fruitless by disease, and he died in 1858.

Bakarganj, or BACKERGUNGE, a district and town of Lower Bengal, British India. The district, with an area of 3,649 square miles, occupies a portion of the delta of the Ganges and Brahmaputra, and is level, well watered, and fertile, the soil being alluvial. Part of the Sandarbans or coast jungles comes within its limits. The town, now almost in ruins, is on a creek of the same name, flowing out of the Ganges. It is 125 miles E. of Calcutta. Barisal has taken its place as chief town of the district.

Bakau, a town of Roumania, nearly 190 miles N. of Bucharest, on the Bisbriszas.

Bakchi-serai. [BAGHTSCHE-SERAI.]

Bakelai, a numerous Bantu people of the Gaboon and Ogoway basins, chiefly between the coast and the Crystal Mountains, reached their present domain from the north-east about 1825, when they drove out the former inhabitants (Shekianis), but are now in their turn pressed upon by the Fans advancing from the north-east. The Bakelai are great traders, and their language (Dikelai) has become the *lingua franca* of the Ogoway regions, and been reduced to writing by American missionaries, who have published *A Grammar of the Bakelai Language, with Vocabulary*, New York, 1854.

Baker, MOUNT, an active volcano in the Cascade Range, an offshoot of the Rocky Mountains, Washington Territory, N. America. Its height is 10,500 feet, and eruptions have frequently taken place in recent times, notably in 1880.

Baker, HENRY, born in London in 1698, after spending some years first as a bookseller and then as an attorney's clerk, took to natural history and antiquarian studies. He was elected to the fellowship both of the Royal and the Antiquaries Society, took the Copley Gold Medal, wrote works on the microscope, a poem on the *Universe*, and many contributions to learned periodicals. He also founded the Bakerian Lectureship, and died in 1774.

Baker, RICHARD, SIR, born about 1568, was knighted in 1603. He appears to have led the life of a country gentleman, and was High Sheriff of Oxfordshire. About 1640 he was imprisoned for debts incurred by his wife's family, and wrote in the Fleet his *Chronicle of the Kings of England*, a book which, though full of errors, enjoyed great popularity, and is often referred to by Sir Roger de Coverley in Addison's famous sketch. Baker died in the Fleet in 1645.

Baker, SAMUEL WHITE, SIR, PASHA, K.C.B., F.R.S., born in London in 1821, showed early a taste for travel and adventure. In 1848 he joined in establishing a colony and coffee plantation in Ceylon, and in 1855 he went to the Crimea, afterwards helping to found the first Turkish railway. Accompanied by his wife, a Hungarian lady, he set out in 1861 to meet Speke and Grant, the African explorers. This was effected in February, 1863, when, acting on their information, he pushed on, and after many dangers and sufferings succeeded next year in discovering the Albert Nyanza. For this exploit he received the distinction of K.C.B. The Khedive gave him in 1869 the command of an expedition to suppress the slave-trade, and to consolidate Egyptian power in the Soudan. In 1874 he resigned this post to Col. C. G. Gordon, publishing a record of his experiences in *Ismailia*. He next visited Cyprus, which he described, and has since travelled over a great part of India. His works include five books of travel, a work on *Wild Beasts and their Ways*, many articles in the *Transactions* of learned societies, and various contributions to the newspaper press. He died in 1893.

Bakewell (*Badequelle* in Domesday), a parish and market-town in Derbyshire, on the W. bank of the river Wye, 2 miles above its junction with the Derwent, and 23 miles N.N.W. of Derby. The town existed in 924, and the Gothic church of All Saints was founded about that period. There is also a very ancient grammar school. Its name is derived from a chalybeate spring, which is still used by invalids. The neighbourhood is most picturesque, and contains Chatsworth, the seat of the Duke of Devonshire, and Haddon Hall, the now deserted house of the Manners family. Pop. (1901), 2,850.

Bakhmut, a town in the government of

Ekaterinoslav, Russia. It is situated in the midst of a large coal-field.

Bakhtegan (also known as Derya-i-Niriz), a salt lake in the province of Faristan, Persia, about 50 miles E. of Shiraz. Its length is about 60 miles, average breadth 10 miles, and it is fed by the river Band-Emir. In summer much of the water evaporates, leaving a valuable deposit of fine salt.

Bakhtiari, a numerous highland people of Luristân, West Persia, who give their name to the Bakhtiari mountains; are a branch of the Lûr (West Kûrd) family, mixed with Persian elements, speech intermediate between Persian and Kurdish; type, West Persian; middle size, brown colour, long black wavy hair, prominent and even aquiline nose, robust frame; two main divisions: *Chahar-lang*, with six branches (Kiyunurzi, Suhuni, Mahmud Salik, Moguwi, Memiwand, Samali), and *Haft-lang*, with three branches (Durkai, Beidarwand, Ulaki). Subject to and classed with the Bakhtiari are also the Dinârûni, Janika-Garmsars, Binduni, and Gunduzlu, the latter originally of Turkoman stock. There is also a Bakhtiari tribe on north-west frontier of India, said to have migrated thither from Luristân, but now mostly fused with the Mian-Khel Afghans. The Bakhtiari are all Mohammedans, but fierce and lawless nomads, who scarcely yield more than nominal obedience to the Persian authorities.

Baking is, strictly, the cooking of food in an air-tight chamber or oven. The term is also applied to the hardening of bricks or pottery.

Baking Powder, usually a mixture of tartaric acid and bicarbonate of soda. The action of the water used liberates carbonic acid gas, which "raises" the dough. Sometimes the buttermilk or other acids used in the composition of the dough render the tartaric acid unnecessary.

Baknol, an illuminating oil obtained from the mineral oils of Baku. Has a specific gravity of about ·83, and a flashing point of about 40° Centigrade (104° Fahrenheit).

Bakony Wald, a range of mountains in Western Hungary, starting from the S. bank of the Danube, a little W. of Gran, and running S.W. between the river Raab and the Platten See, thus separating the great plain of Hungary on the S.E. from the smaller to the N.W. The average elevation is 2,000 feet, and the flanks are densely wooded. Valuable marbles and other mineral products are obtained in the district.

Bakshish, or BAKSHEESH (Pers. *a present*), the word used throughout the East for a small fee given for service or otherwise.

Baku, a district and town in the Trans-Caucasian province of Asiatic Russia. The district extends along the W. shore of the Caspian Sea from a point just below Derbend in the N. to Astara in the S., and includes the promontory of Apsheron (q.v.). It stretches inland nearly as far as Lake Gotcha. Russia has occupied it since 1806. The town and port of Baku lies to the S. of the promontory of Apsheron, and affords safe anchorage for the Russian fleet and numerous trading vessels. It is fortified, and contains an old castle and Persian mosque. Cotton, fruit, opium, rice, silk, and wine are produced, but the place derives its commercial importance from the never-failing springs of naphtha or petroleum, which in ancient times attracted the veneration of fire-worshippers.

Bakuba. [BAYEIYE.]

Bakunin, MICHAEL, was born of an aristocratic Russian family in 1814. After serving in the army he travelled in Western Europe, and came under the influence of George Sand, Proudhon, and the French socialists in 1847. He took part in the German revolutionary movement of 1848-49, was captured by the Russian authorities, and sent to Siberia, whence he escaped. Settling in Switzerland, he founded the Social Democratic Alliance, afterwards merged in the International. He instigated the Lyons outbreak in 1870, and his frank advocacy of pure materialistic anarchy brought him into collision with Marx and his followers. He died at Bern in 1876.

Bala, the name of a market town and lake in the county of Merioneth, N. Wales. The former is situated at the N. end of the lake, 17 miles from Dolgelly and 11 from Corwen. Pop. (1901), 1,544. Bala Lake is 4 miles long by 1 mile broad, and has a depth of 100 feet. It is the chief source of the river Dee, and its shores are highly picturesque. The *Bala Beds* are in geology a well-marked series of Silurian rocks, having a thickness of several thousand feet, and consisting of sandstone, shales, and mudstones, with a band of calcareous nature very rich in fossils, and known as the Bala Limestone.

Balaam, the son of Beor or Bosor, a Chaldean prophet who dwelt at Pethor, in Mesopotamia. When the Israelites, on their way into Palestine, came to the borders of Moab, Balak, the Moabite king, sent for Balaam to curse them At first he refused to obey, being warned by heaven against complying. Finally, receiving a modified permission, he set out without waiting for a summons, and an angel, visible only to the ass that he was riding, barred his path. What ensued is recounted in Numbers xxii. to xxiv. Balaam, with the sanction of God, arrived at Kirjath-Huzoth, Balak's capital, but instead of cursing the Israelite host, was constrained to bless them three times. He returned to Pethor, after advising Balak to use the Moabite women as an instrument for leading the Hebrews into idolatry. Moses at God's bidding then took up arms against the insidious foe, and in the battle that followed Balaam was slain.

Balæna. [WHALE.]

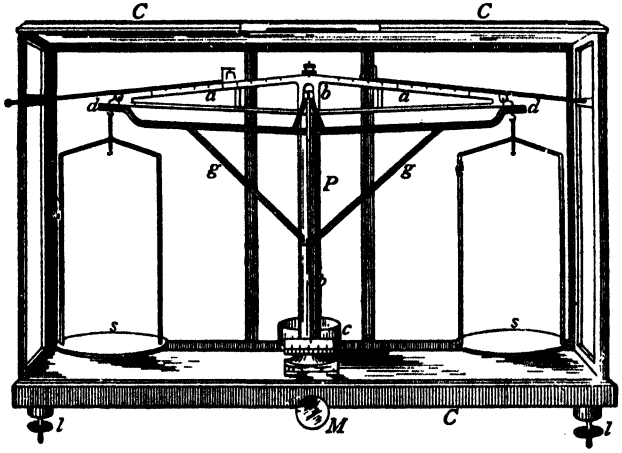
Balæniceps. [SHOE-BILL STORK.]

Balaghat, or BALAGHAUT (Hind. *above the ghâts* or *hills*), a district in the Central Provinces of British India, occupying a lofty and mountainous area of 3,146 square miles. Until 1866 the country was covered with jungles. Immigrants have now brought large tracts under cultivation, and prosperity is gradually advancing.

Balaklava, a small port 6 miles S.E. of Sebastopol, in the Crimea, Russia. It possesses a large landlocked basin with a very narrow entrance,

which served during the Crimean war as the place for disembarking troops and stores for the British Army. The battle of Balaklava (1854), made memorable by the "Charge of the Six Hundred," and by Sir Colin Campbell's splendid handling of the Highland infantry, was fought to the north of the town.

Balance, an instrument for the estimation of mass. The most general form is that of a horizontal *beam*, supported at its centre, with scale-pans



aa, the beam; *p*, the pointer, attached to the beam, to show its oscillations; P, the pillar, a hollow brass cylinder supporting the beam on an agate plane at *b*, by an agate knife-edge; *ss*, the scale pans supported at the ends of the beam on agate knife-edges, *dd*; *gg*, the arrestment, to lift the agate surfaces out of contact when the balance is not in use, so as to diminish wear; M, milled screw to work the arrestment; CC, glass case to enclose the whole, levelled by three levelling screws *ll*, and kept dry by means of a small vessel c containing sulphuric acid.

hanging symmetrically from each end. The instrument admits of very great refinement of detail. For instance, to ensure perfect freedom of motion the beam is supported by an agate knife-edge on an agate plane fixed to the central standard, and the scale-pans are similarly supported on agate planes at each end of the beam. With ordinary balances as in general use in laboratories, one milligram difference may be detected in a load of one kilogramme, *i.e.* one part in a million. The general conditions for the accuracy and delicacy of a balance are: (1) the beam should be horizontal when the pans are unloaded, a condition generally attained by a small screw adjustment; (2) the arms of the balance should be of equal length, otherwise a load at the end of the longer arm will counterpoise a heavier load at the other end. The error produced by this inequality may be removed by weighing the body in each pan separately, and then taking the square root of the product of the two weighings; thus, if the object counterpoise 3 grms. in one pan, and 3·1 in the other, its true mass will be $\sqrt{3 \times 3{\cdot}1}$. Borda's method of double weighing also eliminates this error. If the body in one pan counterbalance a definite quantity of matter in the other pan, and if a weight w does also, then w is the weight of the body; this is the principle of

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the method; (3) the *sensibility*, *i.e.* the amount of turning of the beam for a given small difference in load, should be great. This requisite is very important, and to satisfy it the beam should be light, the arms as long as possible under the circumstances, and the centre of gravity of the beam should be close to the point of support. But this condition satisfied, the beam takes a long time to come to rest, oscillating slowly backwards and forwards to each side of the mean position. Hence a method has been devised of estimating the required mass by observation of the oscillations of the beam. This method of oscillation is invariably adopted in accurate work.

For descriptions of the other forms of balance, *see* STEELYARD, SPRING-BALANCE.

Balance of Power, in European politics, that state of things in which no one of the GREAT POWERS (q.v.) is permitted to preponderate greatly over the rest. The doctrine that its maintenance is a chief object of diplomacy first appears in Modern Europe with the growth of the power of the House of Hapsburg under Charles V. The Thirty Years' War was partly waged in its defence, as well as in that of Protestantism, and it was a prominent factor in promoting the various coalitions against Louis XIV., and the alliances of the various nations of Europe against Napoleon I., while at the Congress of Vienna in 1815 the map of Europe was reconstructed with special reference to its maintenance. Of late years, since the growth of the doctrine of NON-INTERVENTION (q.v.), it has fallen into some disrepute in England.

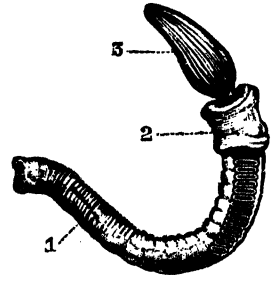
Balance of Trade, a term originating in connection with the MERCANTILE SYSTEM of Political Economy (q.v.). The most important part of the wealth of a nation was held to consist in the specie

acquired by trading with foreign nations. This, it was argued, could always purchase goods on an emergency; other goods could often only be realised with difficulty; and the first duty of a statesman was, therefore, to secure that ample specie should be in the country in case of a foreign war. The object of economic policy was held to be to sell more to the foreigner than was bought from him: he would then have to pay the balance in specie to the exporting country. Thus, when the value of exports exceeded that of imports the balance of trade was said to be favourable. This view is best set forth in Thomas Mun's *England's Treasure in Foreign Trade* (1685). To maintain a favourable balance—usually by prohibition of the export of specie and by high import duties—was the great object of the policy of every European state till Adam Smith showed in the *Wealth of Nations* that a reserve of specie was not necessary for the successful conduct of a foreign war, and that, in fact, the wealth exported to pay for recent wars had taken the form, not of specie, but of manufactured goods. The English Government had remitted the money required by bills which it purchased, and the consequent rise of the premium on foreign bills had stimulated the export of goods against which such bills could be drawn. In recent times the term "unfavourable balance of trade" has been chiefly used with reference to the relation between imports and exports. As "exports pay for imports," owing to the invention of bills of exchange and other substitutes for coin, it would seem to follow that if imports always largely exceed exports in value (as is the case with regard to the United Kingdom) the excess must be somehow paid for out of the national capital, a process which must eventually result in national bankruptcy. The "balance of trade," in fact, is now always apparently unfavourable to England. The explanation is (*a*) that the values of imports are stated to the compilers of the Customs returns *plus* the charges for freight, etc., and the values of exports without this addition; (*b*) the bulk of the excess, however, is due to the interest on our foreign investments and payment for the immense carrying trade between foreign countries, much of which is conducted with English capital. Details will be found in the works of Lord Farrer and Sir R. Giffen.

Balancing of Machines, in mechanical engineering, means the elimination of stresses in the framework of machinery that are caused by the reciprocating motion of heavy parts or by the rotation of masses unsymmetrically disposed about the axes of rotation. Thus it is a general practice to place balance weights on the driving wheels of locomotives, these weights being calculated to neutralise, by their centrifugal force, the effect on the engine frame of the irregular motions of the connecting rod and crank. Balancing is of special importance in quick-speed engines, and affects their efficiency.

Balanidæ, or ACORN-SHELLS, one of the families of CIRRIPEDIA, which are sessile, *i.e.* not provided with a stalk [BARNACLE]. The body is protected by a ring of from four to eight plates forming a short tube which is attached by its base to rocks, shells, etc., and is closed above by two pairs of small plates between which the arms can be protruded; by the movements of these arms the food is obtained as in the barnacle. The young are free-swimming forms, and resemble in structure the mature forms of some lower groups of Crustacea; they possess eyes and other organs not found in the adults, which, it is considered, have been lost owing to the animals having adopted a fixed mode of life. The young belong to the type known as the Nauplius (q.v.). All the *Balanidæ* are marine. Two genera, *Protobalanus* and *Palæocreusia*, are Devonian, and several living genera occur in the Chalk and the Tertiary rocks. *Balanus* is the commonest English genus.

Balanoglossus, a genus of marine worms to which considerable attention has of late years been directed as the possible ancestor of the Vertebrates. The body is composed of three regions: (1) a long worm-like trunk, distinctly ringed at the hinder end, and with a series of pairs of respiratory pores at the anterior end; (2) a collar round the latter portion of the trunk; (3) a contractile proboscis. There is a horizontal bar (described as the "notochord," (q.v.) beneath the alimentary canal which is compared with the vertebral column of the Chordata (q.v.); the canal in this bar is often said to be homologous with the neural canal of the vertebrates, though it occurs in other worms and GEPHYREANS (q.v.). Balanoglossus certainly has resemblances to AMPHIOXUS, but according to the most recent views the structure of the nervous system (a ring round the mouth from which two cords run back along the body) and the fact that the supposed "notochord" is below the main blood-vessel prove that it is a true worm.



BALANOGLOSSUS. 1, *Gastric regions*; 2, *collar*; 3, *Proboscis*.

Balanoglossus lives in mud in warm and temperate seas, as the Mediterranean, round the Channel Isles, and off the coast of Florida. The embryo is known as Tornaria and most resembles the Bipinnaria (q.v.) stage of Starfish.

Balanophyllia, a genus of corals of which one species (*B. regia*, Gosse) occurs on the S.W. coasts of England. This is a small simple coral, usually a quarter of an inch in height; it is scarlet with yellow tentacles.

Balasinor, the name of a small native state and its capital in Gujerat, Western India. The territory has an area of 258 square miles, and the town is about 48 miles N. of Baroda.

Balasore, a district and its capital town in the Orissa division of British India. The district

occupies a strip on the coast of the Bay of Bengal, with an area of 2,068 square miles. Balasore, the capital, stands on the river Barabalang, about 8 miles from the coast. Only small vessels can cross the bar at the river's mouth, but there is a considerable trade with the coast and the Maldive Islands.

Balata, a valuable substitute for guttapercha, being not only ductile but, like caoutchouc, elastic. It is the gum of one or more species of *Mimusops*, trees belonging to the order *Sapotaceæ*, natives of Guiana and the West Indies, and is obtained by incisions in the bark. It was introduced in 1859, but the supply is limited. The name has been corrupted into bullet and bully.

Balaton, LAKE, or PLATTEN SEE, the largest piece of water in Hungary, lies about 56 miles S.W. of Pesth, and has a length of 50 miles, a breadth of from 3 to 10 miles, and an area, including marshes, of 420 square miles. The water is slightly saline, and abounds in fish. It is fed by the river Szala and many small streams, and drains into the Danube. In 1865 it became nearly dry, but has since filled, though a good deal of the swampy land has been reclaimed. It is liable to peculiar disturbances, apparently of subaqueous origin.

Balbi, ADRIAN, born at Venice in 1782, and while still young appointed professor there of geography and natural philosophy. In 1820 he went to Portugal and wrote a statistical work on that country, which brought him into notice. In 1826 he published his *Geographical Atlas*, embracing the latest speculations of Adelung and the German ethnologists. His *Abridgment of Geography* was also a very popular work. He spent the last sixteen years of his life at Padua, where he died in 1848.

Balbi, GASPARD, a native of Venice, who, for the purpose of trading in precious stones, started from Aleppo in 1579 and travelled extensively in the East, visiting Ormuz, Goa, Cochin, and Pegu. On his return in 1588 he wrote a graphic and faithful account of his journey, and soon afterwards died.

Balbo, CESARE, was born at Turin in 1789, being the son of a high official at the Piedmontese court. In 1798 he went to Paris, and at the age of 18 entered the service of Napoleon. After the fall of his master he was employed by the government of Piedmont in diplomatic missions to Paris and London, but lost his political status through the revolution of 1821. Permitted to return to his country in a mere private capacity, he devoted himself to literature and produced a life of Dante, some historical works, and essays advocating the independence of Italy. He died in 1853.

Balboa, VASCO NUÑEZ DE, born in Estremadura, Spain, in 1475, of a poor but noble family, started in 1501 for the Spanish Main, to better his fortunes. For nine years his history is obscure, but in 1510 he accompanied Enciso from St. Domingo to Darien, where he raised a settlement and was mixed up in the wretched intrigues that always occupied the Spanish explorers. In 1513, acting on the information of a friendly cacique, he pushed southwards, entered the continent of South America, and was the first European to behold the Pacific. His kindly treatment of the Indians, and his firm but judicious handling of his followers contributed much towards his success. On his return to Darien he found that Pedrariaz (Davila) had been sent out from Spain as governor with orders to arrest him. However, friendly relations were established and maintained with more or less constancy for two years. Then the jealousy of the governor, who thought that Balboa was gaining independent credit and influence, led to the arrest of the latter on an old charge. He was found guilty, condemned, and beheaded at Ada, in 1517.

Balbriggan, a watering place 21 miles E.N.E. of Dublin. It gives its name to the well-known Balbriggan hosiery.

Balchen, JOHN, a distinguished British admiral, was born on February 2nd, 1669, and having, in early life, entered the navy, became a captain in 1697. In 1707, as captain of the *Chester*, 50, he was, after a gallant fight, taken prisoner by the Chevalier de Forbin in the engagement off the Lizard, but upon trial by court-martial was most honourably acquitted of blame. He commanded many other vessels with credit, but was not promoted rear-admiral until 1728. In 1731 he was second in command at the occupation of Leghorn; in 1733 he was made a vice-admiral; in 1739 he was commander-in-chief in the Mediterranean; in 1743 he was promoted to admiral; in 1744, while governor of Greenwich Hospital, he was knighted; and in the summer of the same year, being in his seventy-sixth year, he sailed with a fleet to relieve Sir Charles Hardy, who was at the time blockaded in the Tagus by the French. He executed his mission but did not live to return. On October 7th, 1744, his flagship, the *Victory*, of 110 guns, with a crew of about 1,150 officers and men, struck on the Caskets, off Alderney, and every soul on board perished. Sir John's body was not recovered; but a monument to his memory stands in Westminster Abbey.

Balcony (Ital. *balcone*), a projecting gallery with balustrade in front of the window, supported on consoles or brackets fixed in the wall, or by pillars resting on the ground below. It is first introduced in Italian architecture.

Baldachin, BALDACCHINO (probably from Baaldak, a mediæval corruption of Bagdad), a richly adorned canopy in the form of a tent or umbrella over a throne, pulpit, or altar; frequently of some durable material, as that cast in bronze by Bernini in St. Peter's at Rome. The name is also given to the canopy borne in Roman Catholic countries over the priest who carries the Host. Canopies made of rich stuffs were frequently sent as presents in the East, whence the name. The proposal to erect a baldacchino in St. Barnabas' Church, Pimlico, London, led to a legal decision (in 1873) that such a structure would be illegal in an Anglican church.

Balder, or BALDUR, in Norse mythology, the son of Woden and Frigga, and the wisest and most beautiful of the gods. His mother, alarmed by dreams, exacted an oath from everything in nature

not to harm him, but overlooked the mistletoe. The malicious Loki found out the secret from her by a stratagem, and when the gods, thinking Balder invulnerable, were casting stones and darts at him, he fetched the mistletoe and placed it in the hands of Höder, the blind god of war, whose aim he then directed towards Balder, who fell dead. Hel, goddess of the nether world, consented to release him, but on condition that all things should weep for him. Loki's step-daughter, Thöck, the giantess, alone refused. So Balder was detained in Hel's kingdom till the end of the world, when after a long struggle with the powers of evil he will return to reign in happiness and peace. Balder was avenged, however, by the Wali, who slew Höder. The story appears to be a nature-myth typical of the triumph of Winter (Höder) over Summer (Balder) and his subsequent defeat by Spring (Wali).

Baldness. [ALOPECIA.]

Baldock, RALPH DE, was educated at Merton College, Oxford, and made dean of St. Paul's in 1294. Ten years later he was elected bishop of London, and in 1307 was appointed Lord Chancellor by Edward I., losing the office at the king's death. His *Historia Anglica*, though seen by Leland, appears to have perished. He also collected the statutes and constitutions of his cathedral church. He died in 1313.

Bald-pate, a local name in the eastern and middle states of the Union for *Mareca americana*, the American Widgeon. [WIDGEON.]

Baldric, a belt or sash, worn partly as a military and partly as a heraldic symbol, round the waist, or over the left shoulder, or supporting a sword. It is often seen represented in the effigies of knights.

Baldwin, or BALDWYN, WILLIAM, a schoolmaster, divine, printer, poet, and comedian, who supported the Reformation, but is best known as having completed, in conjunction with Ferrers, *The Mirrour for Magistrates*, the remarkable poem that Sackville began. He died in 1564.

Baldwin I., King of Jerusalem, born in 1058, accompanied his brothers, Eustace and Godfrey of Bouillon, to the Holy Land. He became Baron of Jerusalem and protector of the Holy Sepulchre, and in 1100 assumed the style of king. His reign was spent in continual warfare with Turks, Arabs, Persians, and Saracens. He took Acre, Sidon, Ascalon, and reduced the whole Syrian coast. He then invaded Egypt, contracted a disease, and returned to Jerusalem to die in 1118. He was buried on Mount Calvary.

BALDWIN II., a cousin of the preceding, succeeded him as titular king. He defeated the Saracens in 1120, but in 1124 was captured, and only recovered his liberty by ceding Tyre. The Order of Knights Templars was founded in his reign. In 1131 he abdicated in favour of his son-in-law, Foulques of Anjou, whose son came to the throne in 1143 as Baldwin III., and died at Tripoli in 1162.

Baldwin, BALDWYN, or BAUDOUIN, the name of eight Counts of Flanders, who played important parts in European history between 837 and 1195, and founded a short-lived dynasty at Constantinople.

BALDWIN I., BRAS DE FER (837–877), the founder of the family, married by force Judith, daughter of Charles the Bald, who, after a defeat, was reconciled to his son-in-law, and helped to consolidate his dominions.

BALDWIN III. (988–1034) annexed a slice of French territory, and first summoned the states of Flanders.

BALDWIN IV. further encroached on France, became a feudatory of the German Empire, gave his daughter Matilda in marriage to William the Conqueror, and took part in the invasion of England, dying in 1067.

BALDWIN VIII., Count of Hainault, marrying Margaret, acquired through her the county of Flanders in 1194, and reunited the two counties. His daughter married Philip Augustus of France.

BALDWIN I., Emperor of Constantinople, was the son of the foregoing, whom he succeeded in 1195. In 1200 he joined the fourth Crusade, but turned aside on his way to liberate Isaac Angelus, Emperor of Constantinople, from his brother who had deposed and imprisoned him. In this the Crusaders succeeded, but on the death of Isaac other pretenders arose, and ultimately Baldwin, with his Venetian allies, took the city, and he was elected emperor with dominions, however, much curtailed. The Greeks, hating the Latin usurpers, rose under Joannices of Bulgaria, defeated Baldwin at Adrianople (1205), and kept him prisoner till his death next year.

BALDWIN II., nephew of the foregoing, succeeded his brother Robert as emperor while a child, in 1228, but John of Brienne actually held supreme power till 1237. The Latins were now in a desperate plight, and practically driven within the walls of Constantinople. After a fruitless struggle the city was seized by Michael Palæologus in 1261, and Baldwin fled to Italy.

Bâle. [BASEL.]

Bale, JOHN, born in 1495, in Suffolk, and educated at Cambridge, was converted to Protestantism and received the support of Cromwell, on whose death he retired to Holland. On the accession of Edward VI. he came back to England, and in 1552 was made Bishop of Ossory. During Mary's reign he once more took refuge on the Continent, but Elizabeth got him a prebendal stall at Canterbury, where he died in 1563. He wrote a number of books, and some of the last miracle plays. His *Illustrium Majoris Britanniæ Scriptorum Summarium* alone possesses much interest, if we except some tracts on the cases of Sir John Oldcastle and Anne Ascue.

Balearic Crane. [CROWNED CRANE.]

Balearic Islands, a group of five islands lying S.E. of Spain in the Mediterranean. Of the three principal members Iviza is nearest to the Spanish coast, being 50 miles distant from Cape Nao. Majorca, the largest of the three, is 43 miles farther to the E., and a channel of 22 miles separates Minorca from Majorca. Formentera is a mere islet to the S. of Iviza, and Cabrera occupies a

similar position with regard to Majorca. The name Balearic, dating from Strabo, is derived from the Greek *ballo* (I throw), the natives having been noted as expert slingers. [MAJORCA, MINORCA, IVIZA, FORMENTERA, and CABRERA.]

Balfe, MICHAEL WILLIAM, born near Wexford, Ireland, in 1808, took to music from his childhood, and in 1816 appeared as a violinist, being engaged a little later in the Drury Lane orchestra. He had at the age of ten composed a ballad, and he now studied composition seriously under Horn, the organist of St. George's Chapel, Windsor. Count Mazzara took him to Rome, where he worked under Frederici and Galli. He came to London to take part in the Benedict concerts, and then the bent of his genius asserted itself. Between 1835 and 1840 he gave to the world some half a dozen popular English operas. In 1844 he supplied Bunn at Drury Lane with *The Bohemian Girl*, recognised not merely in this country but throughout the world as his masterpiece. Having amassed a competency, he spent his last years on his property in Hertfordshire, dying of bronchitis in 1870. Balfe possessed extraordinary facility, keen sense of melody, and a thorough practical knowledge of the requirements of stage and orchestra, but he lacked the highest originality and the power of elaboration necessary for permanent fame as a composer.

Balfour, SIR JAMES, was descended from the ancient family of the Balfours of Mountquhanny, Fifeshire, Scotland, but the date of his birth is not known. Educated for the Church, he joined the conspirators, who murdered Cardinal Beaton and held the castle of St. Andrew's against the forces of Arran. For this he was sent to the French galleys, but escaping in 1550 obtained pardon and place by abjuring Protestantism. He was now a lawyer, and became lord of session, privy councillor, and judge of the commissary court, and later President of the Court of Session. On the death of Moray he once more changed sides, and, the charge of complicity in Darnley's murder being pressed home, he retired to France and died in 1583. He has been styled, not without reason, "the most corrupt man of his age." The authorship of *The Practicks of Scots Law*, a collection of statutes, is attributed to him.

Balfour, JOHN HUTTON, born in Edinburgh in 1808, and connected by descent with the author of the *Huttonian Theory*, received his education at the High School, and at the Universities of Edinburgh and St. Andrew's. Destined at first for the Church, he was attracted to the study of medicine, and won the highest distinctions in that faculty, becoming a Fellow of the College of Surgeons and of the Royal Society of Edinburgh before he was seven-and-twenty. From Dr. Graham he acquired a taste for botany, and in 1841 succeeded Sir W. Hooker as professor of the science at Glasgow, ultimately occupying the same chair at Edinburgh, with the posts of Keeper of the Botanical Gardens and Queen's Botanist for Scotland. He was elected Fellow of the Royal Society of London in 1856. A very able lecturer, Dr. Balfour was no less successful as a scientific writer. His *Class-Book of Botany*, *Outlines of Botany*, *Phyto-Theology*, *Plants of Scripture*, and *Elementary Botany* are still in use. He died in 1884.

Balfour, THE RIGHT HON. ARTHUR JAMES, LL.D., born in 1848, educated at Eton and Trinity College, Cambridge, was returned to Parliament for Hertford in 1874, and from 1878 to 1880 acted as private secretary to his uncle, Lord Salisbury, whom he accompanied to the Berlin Conference. After the general election of 1880 he joined for a time the "Fourth Party," under Lord Randolph Churchill. On the accession of the Conservatives to office in 1885 he became President of the Local Government Board. In 1886 he undertook the arduous duties of Chief Secretary for Ireland. His five years of office were marked by the famous Parnell Commission, the Criminal Law and Procedure Act, the extension of the Land Acts, and Land Purchase Acts. In 1891 he became First Lord of the Treasury, and in 1892 Leader of the Opposition, when the Conservatives went out of office. In 1895, and again in 1900, he was First Lord of the Treasury and Leader of the House, while in 1902, on the retirement of Lord Salisbury, he became Prime Minister. In 1903, when Mr. Chamberlain brought forward his Tariff Reform proposals, Mr. Balfour declared himself in favour of Retaliation as distinguished from Protection. At the General Election of 1906 he was severely defeated, and lost his own seat at Manchester. Before long he was elected for the City of London, and at the 1910 General Election retained his seat. Mr. Balfour is the author of *A Defence of Philosophic Doubt*, *The Foundations of Belief*, *Decadence* (1908), &c.

Balfrush, or BALFUROSH, a town in the province of Mazanderan, Persia, situated on the river Bhawal, 12 miles S. of the Caspian Sea and 20 miles from Sari. It is a large and well-built town in the midst of a forest surrounded by swamps. A large trade is done in silk and cotton manufactures, and the place maintains several colleges, to which moolahs and students resort in great numbers. The population at one time was 200,000.

Balguy, JOHN, born at Sheffield, 1686, and educated at St. John's College, Cambridge, was ordained in 1711. He took an active part in theological controversy, and his work, *Letters to a Deist*, attracted the attention of Dr. Clarke and Archbishop Hoadley. He died in 1748.

Bali, BALLY, or LITTLE JAVA, one of the Sunda Islands in the Eastern Archipelago, is separated from Java by the Straits of Bali, about a mile and a half wide. Its length is 75 miles and its breadth 40 miles, much of the surface being occupied by a mountain range running from W. to E., where it terminates in the volcanic peak Gunungagung, 12,379 feet high, The valleys are well watered.

Bali-Kesr, BALUR-HISSAR, or BALIK-SHEHR, a town in Anatolia, Asiatic Turkey, in the vilayet of Broussa, from which town it is distant 75 miles S.W. Felt is made here.

Baliol, or BALLIOL, SIR JOHN DE, the descendant of Guy de Baliol, who came over with the Conqueror, was established at Barnard's Castle,

Yorkshire, in the reign of Henry III. as a noble of wealth and power. He was governor of Carlisle in 1248, and in 1263 founded Balliol College, Oxford, though the chief benefactor of that place of learning was his widow, Devorgilla, one of the three coheiresses of Alan, Lord of Galloway, and granddaughter of David, Earl of Huntingdon, the brother of Malcolm IV. and William the Lion, Kings of Scotland.

Baliol, JOHN, son of the foregoing, was born in 1259, and inherited from his mother the lordship of Galloway. On the death of the Maid of Norway, Alexander III.'s heiress, in 1290, he was one of the three competitors for the Scottish throne, the other two being Robert Bruce, grandson of the second daughter of the Earl of Huntingdon, and John de Hastings, son of the third daughter. Edward I., interfering for his own ends as arbitrator, decided in favour of Baliol in 1292, and the latter submitted to be crowned as vassal to the English king, who immediately began to goad him into resistance by assertions of absolute authority. Baliol refused to be cited before the English Parliament, or to follow his feudal superior into France, and in 1295 he entered into an alliance with the French king, Philip. Edward thereupon invaded Scotland and seized Berwick, whilst Surrey defeated the Scots at Dunbar, and the whole country as far as Perth was speedily subjugated. Baliol was compelled to surrender and to undergo the humiliation of publicly renouncing his crown at Stracathro (July, 1296). He was committed to the Tower with his son Edward, and remained a prisoner till 1299, when he was sent to Bailleul, the home of his ancestors in Normandy, and died there in 1314. His son Edward regained the throne in 1332 with the connivance of Edward III., but after two or three years resigned his claim to England, and died childless in 1363.

Balistes. [FILE-FISH.]

Balize, or BELIZE, the capital of British Honduras in Central America (lat. 17° 29′ N., long. 38° 8′ W.), stands on the S. bank of the river of that name, and close to its mouth. It was first colonised by the English towards the end of the 17th century. The colony was twice broken up by the Spaniards, but by the treaty of 1783 its possession was confirmed to England. The neighbourhood is low and swampy, and the climate unhealthy, but a large trade is carried on in mahogany, rosewood, cedar, logwood, and other valuable timber. Though somewhat dangerous, the harbour is a regular station for the West Indian mail steamers.

Balkan Peninsula, THE, is the name applied with some vagueness to the projecting mass of land that divides the Adriatic from the Ægean Sea, the northern boundary being drawn at the river Save and Lower Danube. Greece and Roumania, however, are not regarded as being covered by the term, which is usually restricted to the European provinces of Turkey, of past or present times, thus including Bulgaria, Eastern Roumelia, Bosnia, Herzegovina, Novi-Bazar, Servia, Montenegro, together with the purely Turkish provinces of Adrianople, Salonika, Kossovo, Scutari, and Janina. The entire area is irregularly pervaded by the Balkan Mountains (anc. *Hæmus*) and their offshoots, Rhodope, Pindus, and Olympus. They attain their greatest height in the west (6,500 feet), where they have a tendency to run parallel to the Adriatic. Olympus is 9,725 feet in height, and Muss-alla 9,500. Of the thirty passes that cross the main ridge from north to south, the Shipka (for which the Turks fought so gallantly in 1877–8) is the most famous. The Danube claims a large proportion of the country; but in the south, the Maritza, the Kara Su, the Vardar, and the Indje flow from the slopes of the mountains into the Ægean. The only two important lakes are those of Scutari and Ochrida. Within recent years the Turkish empire included the whole peninsula, but gradually complete or partial independence was declared in the following order:—Greece, 1836; Servia, 1830–1867 and 1878; Roumania, 1856 and 1878; Bosnia, Herzegovina given to Austria, 1878, Montenegro, Bulgaria, and Eastern Roumelia, 1878. In 1908 Bulgaria made a complete severance from Turkey, and in 1909 the pre-existing dominance of Austria-Hungary over Bosnia and Herzegovina was consummated by definite annexation. During 1908–9 also complications arose between Austria and Servia, which, however, were adjusted by Great Britain; France, Italy, and Germany assenting.

Balkh, a country and its capital in Central Asia, lying N. of the Hindu Koosh mountains and S. of the river Oxus, and having a length of 250 miles and a breadth of 120 miles. As the ancient kingdom of Bactria, the country was of importance in remote times. It was subsequently incorporated with Afghanistan, and is now subject to the Khan of Bokhara. The city is on the Ardisish river, about 30 miles south of the Oxus. Zoroaster is said to have been born here, and it was a great centre of Buddhism. The inhabitants at present are Afghans and Jews.

Balkhash, BALKASH, or TENGIZ, a lake in the N.W. of Eastern Turkestan, Central Asia. It is about 150 miles long by 75 miles broad, and like other lakes of Asia, receives several rivers, but has no apparent outlet.

Ball. [CARTRIDGE.]

Ball. [CRICKET, CROQUET, FIVES, TENNIS.]

Ball, JOHN, an itinerant preacher, who was excommunicated for denouncing the abuses of the Church, and in 1381 joined Wat Tyler's rebellion. He was executed with Jack Straw at Coventry.

Ball, SIR R. S., Lowndean Professor of Astronomy at Cambridge, born 1840. He is the author of popular works on astronomy, the best known being *The Story of the Heavens*, *Starland*, and *The Earth's Beginning*.

Ballachulish, a village on Loch Leven, Argyleshire, Scotland, 16½ miles S. of Fort William. It has a pier at which the steamers call on their way up and down the Caledonian Canal, and a ferry connects the high roads on opposite sides of the loch. There are large slate quarries in the vicinity.

Ballad (derived from the old French *baller*, to dance) is the name applied over all European countries to any simple, direct story told in simple verse. It was first of all a song sung to the rhythmic movement of a dancing chorus. The ballad belongs to the class of productions in verse known by the name of *Volks-lieder*. It sprang from the bosom of the people. It was composed by one of the people for the pleasure of the people. Perhaps that which now remains of this class of literature once had a particular shape that is now lost. In any case, the incidents of many of the ballad stories, the poetic images, and even the dramatic manner are frequently common to different countries. Of the classes of ballad thus generally diffused there are five main classes:—

(1) Ballads of the supernatural, including those of a ghostly character and those based on a belief in fairies and fairyland.

(2) Romantic ballads, dealing with the familiar events of life—of love, tragic death, etc.

(3) Ballads of adventure. Under this class come several of the Border ballads and those relating to Robin Hood.

(4) Humorous ballads, usually the rendering into verse of some pointed popular jest.

(5) Nursery ballads, including lullabies.

The ballad, even in later times, appears to have been occasionally sung as well as said. Some pieces are made up of prose in addition to verse; the dialogue and the purely lyrical parts are in metre, while the narrative is mainly given in prose. Examples of this are found both in France and Scotland. There is no precise date as to the age of extant ballad literature. Shakespeare speaks of such verse as a familiar thing in his day; but even remote antiquity is pointed to in this matter from the fact that an old folk-song used by Goethe is known to the Bechuanas in South Africa. English and Scottish ballads, however, which can be traced to the fourteenth century, are probably the earliest of surviving forms of note.

In regard to the universality of various characteristics of the ballad there are not a few decided instances. The plot, which is perhaps the most notable, we find repeated again and again. This occurs in at least four different stories. The dead mother returning to her children, the fickle bridegroom won from a second affection by his first love, the beautiful maiden wooed by a false lover who has slain seven women and seeks to slay her, the bride pretending to be dead that she may escape from a hated to an admired lover—all find effective treatment in distinct nationalities. In illustration of the last of these examples we have the story of *Fair Isambourg* in France and *The Gay Gosshawk* in Scotland.

Of the second class, which is a favourite with the Border minstrels, there is an almost exact version in Danish; and of the third there are variants in almost every European country. Other interesting points of resemblance also occur. One of the most prominent of these is the introduction of talking-birds. Nothing comes more naturally to the ballad-writer than the report of the conversation of some hawk or parrot. In Border minstrelsy, Servian song, the Romaic ballads, and French folk-song, it is the same. Besides this we have also the parallel appearance in ballad pieces of different countries of the following features:—(*a*) The representation of the commonest objects of every-day life as being made of gold and silver; (*b*) the constant use of certain numbers, such as 3 and 7; (*c*) textual repetition of the speeches; (*d*) the use of assonance instead of rhyme; and (*e*) brusqueness of recital. Despite these likenesses, however, a well-marked distinctiveness in literary quality appears. For dramatic vigour and picturesqueness the ballads of the Scottish Border, with Denmark, Sweden, and Germany are pre-eminent; those of France are usually bright and graceful; those of Greece excel in literary finish. The purely English ballads, though not lacking in spirit and humour, are often commonplace in style. Mr. Andrew Lang (Ward's *English Poets*, i. 207) has put forward as an explanation of this that the English ballads as we have them have lost their original character as *Volks-lieder*. The transcriber, he maintains, has cut down the material to his hand, till the dulness of prose only was left. It is probably the case, however, that they are there in almost their first shape, though why they should fall so markedly below those of the North in merit it is somewhat difficult to argue. It has been ascribed to climatic influences. English scenery, it is alleged, is comparatively uninspiring; and hence, English popular verse lacks the imagination, the fire, and speed that distinguish the like productions in the North. Still there are exceptions, it must be said, to this in England; there are a few early English ballads of undoubted literary value.

One remarkable feature of the old ballad consists in its half curious, half familiar treatment of the supernatural. There is exhibited a peculiar mysticism, sometimes weird, sometimes playful. In the *Wife of Usher's Well* there is this mysticism of terrible weirdness:—

> "It fell about the Martinmas,
> When nights are lang and mirk,
> The carline wife's three sons came hame
> And their hats were o' the birk.
>
> It neither grew in syke (stream) nor ditch
> Nor yet in ony sheugh (hollow);
> Bnt at the gates o' Paradise
> That birk grew fair enough."

. In *Clerk Saunders*, *Sir Roland*, and in some of the German and Danish ballads we have the same striking presentation of the unseen. Nothing again can be more delightful than the pictures of Fairyland that meet us every now and then in ballad poetry. In *Tamlane*, and in the stories of Thomas the Rhymer and their Scandinavian variants this is charmingly limned. We see its elfin beauty in the brightness of the queen of Faery, in the "bonny road that winds about the fernie brae," and in various other picturesque touches. These ballads no doubt truly reflect in their solemnity and gaiety of sentiment the imaginative beliefs of the people in that idyllic world in which the minstrel lived and moved. The ballads of a romantic caste are mostly concerned with strange and touching incidents of love and war. Pathos and joy naturally divide

their claims in the subject matter. At one time, as in *Love Gregor*, the bride is sacrificed to the hate of a mother. Again, as in the *Gay Goshawk*, the wit of the lovers overcomes every obstacle. Family feuds are frequently the occasion of a telling episode, as in *Barthram's Dirge*, the *Three Ravens*, and other pieces equally grave and impressive. The most prominent examples of ballads of adventure are the riding ballads of the Scottish border, and those that deal with Robin Hood. Of the former collection there are brilliant instances in *Jamie Telfer* and *Kinmont Willie*, passages in both of which have been authoritatively characterised as Homeric in dramatic vividness. Mr. Lang describes the ballads about Robin Hood as "exceedingly English, long and dull." This, however, must be accepted with a considerable qualification. The humorous ballads in various countries are often marked by clever and free play of fancy. Perhaps the best belong to Germany and Scotland.

The time that produced the ballad was wholly before the diffusion of books; with the printing press the office of the minstrel disappeared. This poetical form nevertheless has been cultivated with success in later times, especially in England and Germany. The disuse of the older dialect in Scotland has greatly hindered further accomplishment in the art in that country, though Scott and Allan Cunningham composed ballads of distinct merit in somewhat close imitation of the early examples. In England in the 18th century a like attempt was made, only, however, to incur ridicule, as in Johnson's famous parody. But in recent times ballads of a distinctively powerful kind have been written by Coleridge, Rossetti, and Tennyson. In Germany the art of the minnesinger has been splendidly maintained by Burger, Schiller, Goethe, and Uhland.

The history of ballad-collecting is a matter of some interest. Such pieces, at least in England, were first printed on broadsheets and sold by pedlars. About the time of the Restoration these broadsheets were gathered by collectors as curios; Lord Dorset, Dryden, and Pepys were among such antiquarians. Reprints of any note were first undertaken in the south by Tom Durfey, in the north by Allan Ramsay. Bishop Percy, however, made the great step in this direction by the publication of his *Reliques*, which was based on old copies of ballads in a folio MS. that had come into his hands. In Scotland Herd published what had been called the first useful collection from oral tradition in 1769. Scott, in his *Border Minstrelsy*, continued to a considerable extent the work of Herd. Motherwell's collection (1827) is marked by critical care. A recent important addition to the series of ballad texts is that of Messrs. Furnivall and Hales (London, 1867–8, 3 vols.). This is taken from the folio MS. of Percy. Critics agree in placing first among recent collections in interest and scholarship that of Professor Child (*English and Scottish Ballads*, Boston, U.S., first edition 1857–59, later 1882–98). Other valuable books on the subject are those of Ritson, Jamieson, and Allingham. The old ballads are a very valuable part of poetical literature. Though composed in a rude era, they were the work of men of true artistic genius; the themes, moreover, touch on almost all the chords of human experience. They contain, and vividly set forth in their own way, the elements of the deepest tragedy or gayest comedy. The period of their production would also seem to be in their favour as compositions to be enjoyed by later ages. The spring-time of history that gave them light has lent them a delightful brightness of delineation both in regard to nature and man. Round them, as round the work of Chaucer, we have a poetic atmosphere full of charm, a sweetness that belongs also to the dawn and May. This will always attract; but the material and style of the ballads in themselves must still secure genuine appreciation.

Ballade, a form of poem consisting of one or more triplets of seven or eight-lined stanzas, the last line of which is used as a refrain, and is common to all.

Ballanche, Pierre Simon, born at Lyons in 1776, abandoned in 1813 the business of printer for the pursuit of literature. After spending some years in Italy he settled in Paris in 1824, and his works, dealing chiefly with the regeneration of society, and couched in mystical language, hit off the prevailing spirit of the time. He was elected to the Academy in 1841. *La Palingénesie Sociale*, *Antigone*, *Orphée*, *La Vision d'Hébal*, and most of his other productions are mere rhapsodies, but his views are set forth with more clearness in *Les Institutions Sociales*. He died in 1847.

Ballantine, William, born in 1812, was the son of a well-known metropolitan magistrate, and was himself called to the bar in 1834, and created Serjeant-at-law in 1856. His skill in mastering cases and addressing juries soon gave him a large and lucrative practice in the Crown courts. He figured in almost every important criminal trial, including the notorious Tichborne case, in the earlier stage of which he acted for the defendant. His last great brief was that which he held for the Gaekwar of Baroda in 1875. His health failing, he devoted his last years to recording his *Experiences of a Barrister's Life* (1882), which was followed up by another series of sketches, *The Old World and the New* (1884). He died in 1886.

Ballantyne, James, was born at Kelso, where, in 1795, he started a newspaper and a printing establishment. In 1802 he published Sir Walter Scott's *Minstrelsy of the Scottish Border*, and moving to Edinburgh, founded in conjunction with his brother the publishing firm of John Ballantyne and Co., in opposition to Constable, Scott having a half share of the business. Financial difficulties soon overtook the partners, and Constable triumphed. Ballantyne became an auctioneer of books, and died at Edinburgh in 1821.

Ballantyne, James Robert, born in 1813 at Kelso, and educated at the Scottish Naval and Military Academy, was sent to India in 1841 to reorganise the Sanscrit College at Benares. He was the forerunner of the great investigators of Hindu

literature, editing the *Mahabhashya*, translating many scientific works into Sanscrit, compiling grammars of Hindi, Mahratta, Persian, and Sanscrit, and writing innumerable treatises and papers on Oriental subjects. In 1861 he returned to England, and was appointed Librarian at the India Office, but died in 1864.

Ballan Wrasse. [WRASSE.]

Ballarat, or BALLAARAT, a municipal town and city in the province of Victoria, Australia, 60 miles N.W. of Melbourne. Situated in the midst of the chief gold-field, it has since 1851 grown to be the second city in the province. The Yarrowee Creek divides East from West Ballarat, the latter having been recognised as a city in 1870. The streets of both together cover an area of more than 11 square miles. There are many fine public buildings, and railways communicating with Melbourne, Ararat, and Maryborough. The suburb of Sebastopol has sprung up recently and attained considerable size. Gold digging is still the main industry, but as the surface supply of the alluvial soil has been nearly exhausted, mines have now to be sunk to a great depth. Iron-founding, agriculture, and sheep-farming are also carried on. Ballarat is the seat both of a Church of England and a Roman Catholic bishopric.

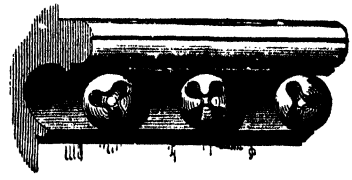
Ballast, in *Civil Engineering*, a term applied to the covering of roads generally, laid for the purpose of keeping them dry, and for giving strength. Ballast is mostly composed of gravel, broken stone, or broken cinders. It should be pervious to water, and slightly elastic. On ordinary roads it is laid to a depth of six to twelve inches; on railroads a thickness of two feet is the rule. [PERMANENT WAY.]

In *Marine Engineering* the term denotes the material taken into a ship when emptied of its cargo, to bring its displacement (q.v.) back to the normal amount. For a vessel to sail uniformly well its total weight should be of constant amount, and should be properly distributed. The cargo, therefore, requires proper placing, and when removed, ballast is required instead. If placed too near the bottom of the vessel, heavy rolling results; if too high, there is a tendency to top-heaviness. The material used is generally stone, gravel, iron, or water. In the case of water ballast, which has many advantages over the others, and is much adopted now, vessels are built with double bottoms, the space between being divided into separate compartments. Into some or all of these compartments water may be admitted when required, the trim of the vessel allowing adjustment by selection of the compartments to be filled. They are usually emptied by steam-pumps. [CARGO, SHIP.]

Ballater, a village in Aberdeenshire, Scotland, 36 miles S.W. of Aberdeen, with which it is connected by railway. It stands at an elevation of 668 feet on the left bank of the river Dee, and is much frequented in summer for its bracing air and chalybeate springs.

Ballet (Fr. *ballet;* Low Lat. *ballare*, to dance, perhaps connected with the Greek *ballo*, I throw), a theatrical exhibition consisting of dancing, posturing, and pantomimic action. It was introduced into Italy during the Renaissance. Ballets with historical or philosophical themes were a prominent feature of French court life, especially under Louis XIV. Noverre in 1749 stripped the entertainment of some of the conventions that had fettered it and revived the dramatic ballet. Since his time there has been little change, except for a further revival in Italy of late years.

Ball-flower, an architectural ornament found in the second or Decorated period of English Gothic architecture (q.v.).



BALL-FLOWER

Ballina, a port and market town in Cos. Mayo and Sligo, Ireland, 7 miles from the mouth of the river Moy, and 19 miles from Castlebar. The river divides the town in two parts, the larger of which is on the Mayo side, the opposite suburb being called Ardnaree. There is a good trade in corn and provisions, and the salmon fishing attracts many sportsmen. The French took the town in 1798 and held it till their defeat at Killala.

Ballinasloe, a market town in Cos. Galway and Roscommon, Ireland, the river Suck, which separates the counties, dividing the town also. It is 34 miles E. of Galway, and 94 miles from Dublin by rail. A great cattle fair is held in October, and the head-quarters of the Galway militia are established here. Close by stands Garbally Castle, the seat of the Earl of Clancarty.

Ballistic Galvanometer. [GALVANOMETER.]

Ballistic Pendulum, a contrivance designed for the measurement of the speed of projectiles, but which has now given way to other and better arrangements for that purpose. It consists of a heavy, drum-shaped block of wood, suspended by a light rod as with an ordinary pendulum. The projectile, so fired into the block as to avoid jarring the point of suspension, shares its amount of motion with the block [MOMENTUM], which will therefore start moving with a certain velocity. Observing the displacement of the pendulum from its mid-position, and with a knowledge of the weights of the projectile and block, the velocity of the former may be estimated.

Balloon. A general account of the historic development of aerial navigation has been given in the article AERONAUTICS. It is necessary here to explain the general conditions to be followed in the design of balloons, and the directions in which improvement may be sought. Archimedes' principle

tells us that the entire weight of a balloon and its appendages must be less than that of the air displaced. Hence some substance specifically lighter than air, such as hydrogen gas, must form part of the balloon. The lighter the gas employed, the smaller the volume of it required to raise a given load. The above principle, again, assigns a limit to the height a balloon can rise, for it evidently cannot be sustained at a height where the density of the atmosphere is less than that of the enclosed gas.

A definite quantity of this gas must be contained in an envelope of suitable dimensions and strength. As the balloon rises, the external pressure of the atmosphere diminishes, thereby increasing the tendency of the enclosed gas to burst its envelope. The spherical-shaped envelope is the strongest, and has been generally adopted. When translation from place to place is effected by air currents simply, this form is very convenient; but when the air-vessel is intended to provide its own means of locomotion, a shape is required that shall combine strength with small resistance to its motion through the air. Such we have in the torpedo-shaped aerostat.

Concerning the motive power necessary to make our vessel more or less independent of the various air-currents, some means for the compact storage of energy readily convertible into motion must be available. This we find provided in its, so far, most practical form in the petrol or benzine motor. So huge an aerostat (q.v.) as the *Zeppelin*, 453 feet in length, requires two 85 h.p. motors, to drive which benzine is used. The British airship *Beta*, which made its first flight over London in July, 1910, is 120 feet long, and the propulsory force is by one 50 h.p. petrol-driven motor. Reconnaissance in war by means of balloons has frequently been resorted to; notably American Civil War, 1860; Siege of Paris, 1871; Boer War, 1899; Russo-Japanese War, 1899–1902.

Ballot (Fr. *a little ball*), a term derived from the practice of voting secretly by depositing a ball in a box, as is still done in elections at clubs. The name has been extended to all systems of voting which aim at secrecy, as well as to the balls, tickets, or printed forms used in them.

The ancient Athenians voted secretly with oyster-shells [OSTRACISM], or in judicial proceedings with beans or balls; the ancient Romans with stamped clay tablets (tabellæ). Athenian officials were, however, generally selected by show of hands or (for the less important offices) by lot. In the public assembly the ballot was only used in questions of a distinctly personal kind, *e.g.* admission to citizenship.

Vote by ballot on bills or resolutions has occasionally been adopted in legislatures. It was used (for instance) in the Venetian Senate, and an attempt was made to introduce it in the English Parliament in 1710; but it is inconsistent with the responsibility of representatives to their constituents. By far its most important use is in the election of representatives in the legislature and public functionaries. In England it was suggested during the 18th century; a bill was introduced into Parliament by O'Connell in 1830; it was in the first draft of the Reform Bill of 1832, and a resolution in its favour was moved annually (at first by the historian George Grote) for many years in the House of Commons, and in 1851 was carried against the Government, but without result. It was for many years a leading feature in the Radical programme, and was one of the six points of CHARTISM (q.v.). In 1870 a select committee of the House of Commons reported in its favour, and it was used in the School Board elections of that year; and in 1872 Mr. W. E. Forster's Ballot Act was passed. The system then introduced was at first temporary and experimental, but has succeeded admirably, and may now be regarded as permanent.

In some of the English colonies in America the practice of secret voting had existed from the first, and the ballot is now adopted throughout the United States for all Federal and State elections. It is prevalent also in the self-governing English colonies, and in most if not all the countries of Europe which have adopted parliamentary institutions—in France, Germany, etc. In Italy the voter must write the name of the candidate he supports, in the polling place, on a paper which he then folds and puts in the box. But the systems in use may be reduced to two types—the American or ticket system, and the English system.

In the former each party issues printed tickets, or lists of all its candidates (often very long, as elections for all Federal and State offices usually take place at the same time in the United States), and (where the election is to more than one office) "pasters," or adhesive slips, each printed with the name of a candidate. Voters who object to any candidate on the ticket issued by their own party can thus substitute another name, or they may simply erase that of the candidate they dislike. These tickets and pasters are usually obtained from a party agent outside the polling place, and deposited in the ballot box. This plan is obviously fatal to secrecy, and the system facilitates fraud—two or more tickets (printed on thin paper for the purpose) being sometimes folded and deposited together—while the presiding officials have been known to "stuff" the boxes with tickets of the party they favoured, before the proceedings began. (In California glass ballot boxes have been adopted to check this.) The system therefore is gradually giving way in the United States to the English system—called, out of consideration for the feelings of the Irish voter, the "Australian system." In this (as established by Mr. Forster's Act throughout the United Kingdom) the voter, after he has entered the polling place, receives a numbered ticket, containing the names of all the candidates. He makes a cross opposite the names of those he supports, and then folds the paper and deposits it. Any other mark renders the paper void. A note is taken of the number, in case of a scrutiny on petition, but except when this is resorted to (which it very rarely is) secrecy is absolutely assured. The papers are shuffled together before being counted, and after the count they are sealed up in the presence of representatives of both parties and

transmitted to a Chancery official, who destroys them after one year. In the hurried count of some thousands of papers during the two or three hours between the close of the poll and the declaration no individual voter's paper can possibly be traced. Special provision is, of course, made both in England and America for blind and illiterate voters.

The introduction of the ballot in political elections has often been condemned (by J. S. Mill for instance) on the ground that "a vote is a public trust." Experience, however, shows that many voters are unable to resist the temptations offered them to vote against their convictions. Since its introduction in England bribery and intimidation have very greatly decreased.

Ballota, a genus of weeds belonging to the Labiate family, with an offensive odour, including *B. nigra*, the black stinking horehound.

Ballycastle, a small port in Co. Antrim, Ireland, at the foot of Knocklayd Mountain, opposite Rathlin Island, and five miles S.W. of Fair Head. It is on a romantic part of the coast, the Giant's Causeway being 12 miles to the east, whilst the ruins of Bonamargy Abbey and of an old castle are in the neighbourhood. It has a railway station, but the shipping trade is now slight, and the harbour is blocked with sand.

Ballymena, a market town in Co. Antrim, Ireland, in a plain on the right bank of the river Braid, 33 miles N.W. of Belfast, and with a railway station. The district is fertile and thickly populated, the cultivation of flax and the weaving and bleaching of linen being the chief industries. The linen market is one of the largest in Ireland.

Ballymore, a parish in the eastern part of Co. Armagh, Ireland. It contains the town of Tanderagee, and the railway station of Poyntzpass Smaller places bearing the same name exist in Westmeath, Wexford, and Donegal.

Ballyshannon, a port and market town in Co. Donegal, at the mouth of the river Erne, 157 miles from Dublin by rail. The harbour is blocked by a bar which impedes commercial traffic. Just above the town a fine cataract is formed by the Erne, and a bridge of fourteen arches spans the river nearer the sea. The salmon-fishing is excellent.

Balm, the popular name for *Melissa officinalis*, a honey-yielding labiate plant.

Balm of Gilead, or OF MECCA, or OPOBALSAMUM, a fragrant oleo-resin obtained by incision in the bark of *Balsamodendron Opobalsamum* and *B. Berryi*, Arabian trees belonging to the order *Terebinthaceæ*. The name is given in gardens to the fragrant labiate, *Dracocephalum canariense*, and in America to a poplar, *Populus candicans*, and to the resin of *Icica Caranna*, Brazilian Elemi, a tree related to *Balsamodendron*.

Balme, COL DE, a mountain pass at the N.E. end of the valley of Chamounix on the way to Martigny. It is 7,200 feet in height, and comes between the Mont Blanc range and the Dent du Midi, being on the border line of France and Switzerland.

Balmoral Castle, a royal Highland residence in the parish of Crathie, Aberdeenshire, Scotland, on the river Dee, 52½ miles W. of Aberdeen. The spot was visited by Queen Victoria and Prince Albert in their first Scottish tour, and it pleased them so much that Prince Albert in 1848 bought the lease of the estate, and four years later acquired the fee-simple from the trustees of the Duke of Fife for a sum of £32,000. A new house was erected in 1852, consisting of two blocks united by wings with a lofty tower and turret, the whole being built of massive granite. The nearest railway station is Ballater, nine miles distant, whence the journey to London is 572 miles.

Balnaves, HENRY, born at Kircaldy in Fifeshire, Scotland, of poor parents, early in the sixteenth century, was educated at St. Andrew's and in Germany, where he adopted Lutheran principles. On his return to Scotland he took up the profession of law, and the regent Arran made him secretary of state. In 1543 he was imprisoned for his Protestantism. He now openly joined the reformer, was supposed to be privy to the murder of Cardinal Beaton, and in 1547 took refuge in the castle of St. Andrew's. He was captured and sent to Rouen, but in 1554 Mary of Guise recalled him, and he was one of the commissioners to revise *The Book of Discipline*. He died in 1579, and his book, *The Confession of Faith*, was published posthumously.

Balrampore, or BULRAMPUR, a town in the division of Faizabad, province of Oude, British India, near the frontier of Nepaul, is situated on the river Bubbaie, about 50 miles S. of Mount Devalagiri.

Balsall, or BASALL HEATH, a suburb to the S.E. of Birmingham, and included in the Parliamentary borough, but within the boundaries of Worcestershire. It has grown rapidly of late years, and has a large population engaged in hardware manufactures.

Balsam, a garden plant, *Impatiens Balsamina*, belonging to the tribe *Balsamineæ* of the order *Geraniaceæ*. It is an East Indian annual, and its naturally monosymmetric flowers, with a large spur to the posterior sepal, have been so doubled in cultivation as to be almost polysymmetric.

Balsams, resinous substances, or solutions of resins in a volatile oil, which exude from certain trees, either naturally, or as a result of incisions. Some of them have a peculiar aromatic odour and pleasant pungent taste, owing to the presence of certain organic acids. The term balsam is sometimes restricted to this group alone, but is more generally used in the wider sense. They were known to the ancients, and employed by the Romans and Greeks for the preparation of incense. They are used, but not to a large extent, in medicine. Some of the more common balsams are:—BENZOIN (q.v.), STORAX, a grey brown liquid obtained in Asia Minor from *Liquidamber Orientalis*. CANADA BALSAM exudes from the Canadian fir, *Abies balsamea*, used as a cement, and, owing to its refractive index being almost identical with that of crown glass, largely employed in mounting microscopic

objects. BALSAM OF CAPAIVA, or COPAIBA, is an acrid oleo-resin obtained from several species of the leguminous *Copaifera*. BALSAM OF PERU is the fragrant oleo-resin obtained from the stem of *Myrospermum Pereiræ*, a leguminous tree of Central America. BALSAM OF TOLU is a similar substance, obtained from *M. toluiferum* in Venezuela and New Granada, and employed in cough-lozenges.

Balta, a circle and its chief town in the government of Podolia, Russia. The town is on the river Kodima, a tributary of the Bug, and connected by railway with Moscow and Cracow. Two great fairs are annually held here, and there is a large trade in cattle, horses, and local produce.

Baltic Provinces, the name given to the Russian provinces of Finland, Courland, Petersburg, Livonia and Esthonia (all of which see); sometimes, however, Finland and Petersburg are not included in the group.

Baltic Sea (classic *Sinus Codanus*), the name of uncertain derivation by which most geographers designate the great gulf of the North Sea known to those who dwell on its shores as the *Ost See* or East Sea. It extends in a north-westerly direction between Germany and Russia on the one side and the Scandinavian Peninsula on the other, being cut off from the North Sea by Denmark, except where the narrow passages of the Sound and the Great and Little Belt provide outlets. The northern portion beyond the Aland Isles is called the Gulf of Bothnia, and large indentations on the Russian coast form the Gulfs of Riga and Finland. The total length is 900 miles, and the breadth varies from 100 to 200 miles, and the area about 160,000 square miles. It is on the whole a shallow sea, shelving up from the northern shores, which are in places rocky and precipitous, to the flat, sandy coasts of Russia and Germany. The water is brackish, owing to the number of rivers, such as the Vistula, Neva, Oder, Dwina, Tornea, etc., that flow into it. Many islands dot its surface, the largest of them being Fünen and Zealand, at the entrance; Oeland, off the Swedish coast; Gothland, almost in the middle, opposite the Gulf of Riga; and the Aland group, just beyond the opening of the Gulf of Finland. From the middle of December to the beginning of April it is practically closed to navigation, owing to the ice that blocks the gulfs and harbours. St. Petersburg is situated at the head of the Gulf of Finland, and is protected by the strong fortresses of Sveaborg, Viborg, and Kronstadt. Kiel, the S.W. angle, is the chief station of the German navy; and Stralsund and Rügen afford excellent harbours. Dantzig, Riga, Memel, Karlskrona, Umea, Lulea, and Tornea export large quantities of corn, hemp, tallow, and timber. Amber is a characteristic product of the southern coasts.

Baltimore, an important city in Maryland, United States of America, on the north side of the Patapsco river, the bay of the same name forming a convenient harbour. It is 37 miles N.E. of Washington and 100 miles S.W. of Philadelphia, and, together with the county in which it stands, derives its name from the Earl of Baltimore, to whom the colony of Maryland was granted in 1631. The city, which was founded in 1729, now covers an area of more than 10,000 acres, and is famous for its fine public buildings and monuments, amongst which are the City Hall, the John Hopkins University, the Peabody Institute, the Roman Catholic Cathedral, with numerous colleges, churches, hospitals, and theatres; the Washington Statue, and the Battle Monument. The flour market is one of the largest in the States, and tobacco is a valuable export. Brick-making, iron-founding, ship-building, brewing, and the manufacture of woollen and cotton goods are important industries; and the oysters of Chesapeake Bay are a great source of profit. Baltimore is connected by railway with all parts of North America.

Baltimore, GEORGE CALVERT, created Baron Baltimore in the peerage of Ireland in 1625, was born in Yorkshire about 1580, and, entering Parliament in 1609, rose to be Secretary of State in 1619. He retired from office as a Catholic in 1625, and for a short time lived on his Irish estates; but having for some time been interested in the colonisation of Newfoundland he went out to America, and ultimately settled in Maryland, for which colony a charter was granted to his son. He died in 1632.

Baltimore Bay, an inlet from Chesapeake Bay, near the head on the western side. It has a length of about 14 miles, and the city of Baltimore is situated at its extremity, being about 250 miles distant from the Atlantic.

Baltimore Bird, BALTIMORE ORIOLE (*Hyphantes baltimore*), an American finch-like bird, ranging from the Atlantic coasts to the high central

BALTIMORE BIRD (*Hyphantes baltimore*).

plains, and southward to Panama. The male is about seven inches long with sharp conical bill; head all round and to middle of back, scapulars, wings, and upper surface of tail, black; rest of under parts, rump, upper-tail coverts, and lesser

wing coverts, with ends of tail-feathers (except the two innermost), orange-red; edges of wing quills, with a band across the tips of the greater coverts, white. The colours are much less brilliant in the female, and each of her feathers has a black spot. The males come north about the beginning of May, and are soon followed by the females. They are gregarious birds, building fearlessly in gardens near houses, and compensating the farmer for the tax they levy on his fruit by the swarms of insects they devour. The song of the male is loud and sweet, and the female has a softer note, which she utters incessantly while building. The nest is a cylindrical pendulous structure, formed by interweaving the filaments of flax-like plants, and usually contains five white eggs marked with purple. The epithet "Baltimore" refers to the resemblance of the plumage to the colours of Lord Baltimore's livery; the popular name "hang-nest" to the mode of nidification. In New England these birds are called Golden Robins. [ORIOLE.]

Baltistan, or LITTLE THIBET, often called Iskardoh, from the name of the chief town, is an administrative district in the north-east of Kashmir, containing the valley of the Upper Indus, and having a mean elevation of 11,000 feet on the flank of the Kara Korum mountains. One of the loftiest peaks in the world is within its borders. The inhabitants are of Mongolian race.

Balûchi (BELÛCHI, BILÔCHI), an East Iranian nation, properly the lowlanders, as opposed to the Brahui, or highlanders, of Baluchistân, or Beloochistan (q.v.), to which they give their name; partly in Katch-Gandâva, but in centre and west reaching to Karmân, in Persia, and even to Strait of Ormuz; are all Mohammedans (Sunni sect), and even claim Arab descent, but are undoubtedly Iranians, with regular Aryan features, light brown complexion, hair often chestnut and even fair, eyes light grey and sometimes blue; speech, a rude uncultivated variety of old Persian, with two marked dialects, a northern and a southern (Makrâni). Socially, the Balûchi are divided into *tomuns*, or tribes, under a tomundâr (head chief); *paras* (clans), under a mugaddam; and *palli* (septs), each under its own headman; and again subdivided into family groups. Thus the tribal subdivisions are almost innumerable, but are reducible to three main branches:—1. *Narûi* (Nharûi), in the centre and west, including the Rakshâni, Sajadi, Khasoji, Shahadi, Minds, Arbabi, and Malika; 2. *Maghzi*, in Katch-Gandâva and East Makrân, comprising the Lashâri, Nari, Jatki, Kalandarâni, Kakrâni, and others; 3. *Rind*, also in Katch-Gandâva, intermediate between the Balûchi proper and the Jats, include the Rindâni, Dinâri, Jalambâni, Dumki, Bolêdi, Kharâni, Nusherwâni, Bugti, Mari, Lagâri, Lurd, and many others. Most of the Balûchi are still nomad pastors and marauders, raiding especially westwards far into Persia. But they are very brave and amenable to discipline, and many take service under the British râj.

Balustrade, a series of *balusters* (so-called from their supposed resemblance to the flower of the pomegranate, Greek *balaustra*) or small pillars supporting the rail of a balcony or staircase. It originated in the architecture of the Renaissance.

Balzac, HONORÉ DE, born at Tours in 1799, began life in a notary's office, but, following the bent of his genius, soon took to writing, under the name of Horace de St. Aubin. His early stories met with scant appreciation. In 1830 he attracted popular attention by his *Physiologie du Mariage*; *Les Derniers Chouans* and *La Peau de Chagrin* confirmed this success, and for the next twenty years he laboured with ardent though fitful industry as a novelist, producing eighty-five works, and establishing a reputation which still remains unrivalled. His careless and extravagant habits rendered his life miserable, in spite of the large sums that he earned; but not long before his premature death, in 1850, he married Mme. Hanska, a wealthy Polish lady, whose fortune relieved him from painful embarrassments. Balzac's merits as a novelist have provoked keen discussion, but the commanding nature of his genius is more and more appreciated as years go on. To say that he founded the French realistic school is small praise. Whilst possessing the faculty for describing the facts of Parisian life with laborious minuteness, he was an artist of creative gifts, and his sympathies extended into the spiritual and visionary world; whilst he fully appreciated the softer and more domestic influences of the country without being blind to the darker phases of rural society. It would be difficult to imagine books separated by a wider gulf than that which lies between *Le Père Goriot* and *Le Médecin de Campagne*, *Les Parents Pauvres* and *Louis Lambert*, *La Maison Nucingen* and *Eugénie Grandet*. It must be admitted, however, that he dwells rather more forcibly on human vice than human virtue, for he lived in the corrupt France of the Restoration. His personal character was simple and amiable. Though extravagant, he indulged but little in the pleasures of life, working with remarkable pertinacity for weeks together, and often re-writing his manuscript from beginning to end. Yet in spite of this industry his style is peculiar and frequently obscure.

Balzac, JEAN LOUIS GUEZ DE, born at Angoulême, in 1594, of a noble French family, was patronised by Richelieu, who made him a counçillor of state and historiographer royal, with a pension. His *Letters* are of high interest; and amongst his other works, *Le Prince*, *Le Socrate Chrétien*, *Les Entretiens*, *L'Aristippe*, and *Le Christ Victorieux* are the most noteworthy. After leading a somewhat dissipated life at Court he retired into a monastery, gave himself up to good works, and died in 1654.

Bâmana. [BAMBARRA.]

Bambangala, the native name of an antelope found in the Congo Free State, and described by Captain Bateman in his book, *The First Ascent of the Kasai*, as "in size as large as a mule; of a bright chestnut colour, striped with creamy white, much in the manner of a zebra, on the back and sides, and dappled on the neck and flanks." Dr. Sclater considers that it is probably a new species of the genus Tragelaphus.

Bambarra, a country in the north-western region of Central Africa (lat. 10° to 15° N., long. 5° to 10° W.). It lies south of Ludamar, north of the Kong Mountains, and east of Kaarta and Mandingo, but is of somewhat vague extent. Watered by the Niger or Joliba, the soil is fertile, and the natives are fair cultivators. Maize, rice, millet, cassava, dates, cotton, and palm-oil, are the chief products. There is a brisk trade with Timbuctoo farther inland, and with the coast.

The inhabtants are a large Mohammedan Negroid Negro people of the middle Niger basin south and west from Timbuktu. The name "Bambarra" is not that of the land, but the name given to its inhabitants, the Bâmanas, by the surrounding Senegal peoples. The Bâmanas are a branch of the great Malinké (Mandingo) family, mixed with Fulahs, whom they resemble in their comparatively light complexion, well-shaped nose, and thin lips, while the woolly hair betrays the Mandingo (Negro) substratum. The Bâmana infant is born a whitish-yellow, which gradually darkens to a yellowish-brown. At present a mild, inoffensive people, the Bâmanas were formerly great warriors, who conquered their present domain in the eleventh century under Fulah chiefs. The aborigines were reduced to slavery; and the account given by Golberry of the "Bambarras" applies, not to the Bâmanas, but to these aborigines, who are of pure Negro type.

Bamberg, a city in the circle of Upper Franconia, Bavaria, South Germany, on the river Regnitz, a tributary of the Maine, and 33 miles north of Nuremberg. The cathedral, dating from 1004, contains the tomb of its founder, the Emperor Henry II., and his Empress Cunegund. The university (1147), Ludwig's Hospital, and the palace are interesting buildings, and traces exist of the ancient walls. Bamberg was formerly governed by independent bishops, but early in the 19th century became part of Bavaria. The district is productive, and there are thriving local industries, chief of which is brewing. A railway connects the town with Nuremberg.

Bambino, a term in *Art* applied to the figure of the infant Christ depicted in swaddling clothes.

Bamboo, the common name for the large tree-like grasses belonging to the genus *Bambusa*, of which upwards of thirty species are known, mostly natives of the tropics. Some of them send up canes from their rhizomes fifty or sixty feet high in a single season, and in others one of the hollow internodes may reach a foot in diameter or more than three feet in length. They sometimes secrete masses of silica, known as tabasheer, in their joints. Their leaves are broader and more distinctly stalked than those of most grasses, and their flowers more nearly approach the type of monocotyledons, having generally three lodicules, or perianth-leaves, six stamens, and three carpels. In China, Japan, Java, etc., the canes are employed for an infinity of purposes, masts, sails, mats, tables, chairs, flower-pots, etc.

Bamborough (BAMBROUGH, or BAMBRUGH), a village and parish in the county of Northumberland, on the coast, about 16 miles from Berwick. The old castle, alleged to have been founded in 548

BAMBOO.

by Ina, King of Northumbria, is now a refuge for shipwrecked sailors. It was a royal borough before the Conquest, and formerly returned two members to Parliament. Off the coast lie the Farn Islands, with their lighthouse—the scene of the exploit of Grace Darling, who lies buried in the churchyard.

Bambouk, a country in the north-west of Central Africa, lying east of Senegambia and west of Bambarra, between the main stream of the Senegal river and its tributary, the Faleme, with a length of 100 and a breadth of 80 miles. It is mountainous, but possesses fertile and well-watered valleys, where cotton, maize, millet, and melons grow abundantly. The climate, however, is singularly unhealthy; and the negro population, of the Mandingo race, is backward in civilisation. Gold is found and exchanged for merchandise.

Bamian, a town, valley, and pass in Afghanistan, between the Hindu Kush and Koh Sia mountains, on the way from Kabul to Balkh. The pass, also known as the Kalu Pass, has an elevation of 12,000 feet. In the valley lies the city, scattered over a considerable area, and remarkable for the caves and colossal statues hewn out of the surrounding rocks. These remains are most abundant on the site of the city or Buddhist shrine of Ghulgulah, which was destroyed by Zenghiz Khan about 1222 A.D.

Bampton Lectures. John Bampton, Canon of Salisbury, left property to the University of Oxford, now producing £200 per annum, to provide for the delivery of eight lectures annually during the latter part of Lent and the earlier part of Easter Terms on the authority of the Scriptures, the doctrines of the Church, the value of the Christian Fathers, the Creeds, or other (specified) subjects of the

Christian Faith. The first appointment was made in 1780. The lecturer, who must be at least a Master of Arts of Oxford or Cambridge, is appointed for one year by the neads of colleges, the year before his lectures are delivered. Newman, Mozley, Liddon, and other distinguished Anglican preachers have been among the lecturers.

Ban. [BANNS.]

Banana, *Musa sapientium*, a handsome herbaceous monocotyledonous plant, long cultivated in tropical and sub-tropical countries for its fruit. The sheathing bases of the large, oblong, pinnate-veined leaves form a false stem 20 to 30 feet high. The spike of irregular flowers is succeeded by a branch of 100 to 200 fruits, weighing together from 50 to 80 pounds. The long, berry-like fruits, as they ripen, convert nearly all their starch into sugar and pectose, and form a valuable article of food, the staple food in many tropical countries, producing 44 times the weight of food per acre yielded by the potato. The importation of bananas has enormously increased of late years. The plantain (*M. paradisiaca*) is very closely related to the banana.

Banat, literally *county*, a term now specially applied to a district in S. Hungary, with an area of some 7,600 square miles, bounded by the river Theiss on the W. and Transylvania and Wallachia on the E. Formerly occupied by marshes and forests, it is now populous and thriving, and produces maize, wheat, cotton, silk, horses, and cattle. In the mountains to the E. are found iron, copper, lead, tin, coal, and small quantities of gold. It is divided into the counties of Thorontal, Temesvar, and Krassova, and the chief town is Temesvar. The population consists of settlers of various nationalities, who have immigrated for the purpose of reclaiming the soil.

Banbury, a market town and municipal borough in Oxfordshire, near the borders of Northamptonshire, into which it extends. It formerly returned a member to Parliament, but the representation is now merged in a division of the county. The Great Western and London and North-Western Railways have stations here. Its market is supplied by a fertile and prosperous neighbourhood, and there are some local industries, the making of agricultural implements being the chief. The once famous cross has been destroyed, but Banbury cakes are still celebrated. The battle of Edgecott or Banbury was fought close by in 1469, and Edgehill, the scene of the first engagement between Charles I. and the Parliamentary forces, is a few miles distant. Pop. (1901), 12,967.

Banca, an island belonging to the Dutch in the Eastern Archipelago, off the S.E. coast of Sumatra. It has an area of 6,883 square miles, and possesses valuable tin mines, worked by Chinese labour. The climate is very unhealthy for Europeans.

Bancoorah, or BANKURA, a district and its capital in the Burdwan division of Bengal, British India. The district has an area of 2,621 square miles, and produces rice, cotton, and indigo, but is imperfectly cultivated. The town, which is the administrative centre, stands on the river Dhalkisor, about 100 miles N.W. of Calcutta.

Bancroft, GEORGE, born in Massachusetts in 1800, was educated at Harvard College, at Gottingen, and at Berlin. He wrote in early life a volume of poems, translated Heeren's *Reflections on the Politics of Ancient Greece*, and began his great historical task, but entering the service of the Democratic Government became successively collector of the port of Boston, secretary to the navy, and minister plenipotentiary at the English Court, where he won much esteem. He retired in 1849 to devote himself to literature, writing frequently in reviews, and composing the chief work of his life, *The History of the United States*. From 1867 to 1871 he resided as American minister in Berlin. As a historian he is painstaking, philosophical, and tolerably impartial, but his style lacks brightness, and he gives the impression of being weighed down beneath the burden of his materials. He died in 1891.

Bancroft, RICHARD, born at Farnworth, Lancashire, in 1544, and educated at Cambridge, became rector of St. Andrew's, Holborn, in 1584. He distinguished himself by his violent attacks on the Puritans, and in 1597 was made Bishop of London. He was one of the principal commissioners at the Hampton Court Conference, and on the death of Whitgift was translated to the See of Canterbury. His zeal for uniformity was unbounded, and he deprived forty-nine suspected ministers of their livings. He was the chief overseer of the Authorised Version of the Bible, but died in 1610, a few months before its publication.

Band of Hope. [TEMPERANCE.]

Banda, a district and its capital in the Allahabad division of the North-West Provinces, British India. The district has an area of 3,061 square miles. It is watered by the Tamna and its tributaries, and is generally fertile; but little more than half has been brought under cultivation, cotton being the most valuable product. Hindus form the largest element in the population. The climate is extremely hot in summer, and somewhat cold in winter. The town stands on the river Kén, about 100 miles west of Allahabad.

Banda Islands, THE, or NUTMEG ISLANDS, twelve in number, situated in the Banda Sea, south of Ceram, form a group of the Eastern Archipelago, and belong to the Dutch. Their total area amounts to some 7,150 square miles. The largest, called Banda Lantoir, from the abundance of *Lontar* palms, is exceedingly unhealthy, and so Banda Neira is made the seat of government. Several are inhabited. Earthquakes and eruptions are frequent and disastrous, Gunong Api containing an active volcano. Nutmegs and mace, cultivated by Chinese or Malay coolies, constitute a very valuable product, and gold is found in Rosyn-gain. Banana Island is famous for fruit. Lantoir and Neira possess excellent harbours.

Banda Oriental. [URUGUAY.]

Bandages. [SURGICAL DRESSINGS, SPLINTS. SLINGS, ETC.]

Bandajan, a pass leading from the Mazafarabad division of the State of Kashmir over the Himalayas. It has an elevation of 14,854 feet, and is amidst crags of gneiss covered with perpetual snow.

Bandana, a printed handkerchief of Indian origin, now largely made in Great Britain. The cloth (usually cotton) is first dyed Turkey red, and then pressed between metal plates on which the pattern is cut. Bleaching liquor is then run in, and discharges the colour from those parts of the cloth to which it is admitted, it being kept out of the other parts by the enormous pressure to which they are meanwhile subjected.

Bandello, MATTEO, born at Castelnuovo, Italy, in 1480, entered the Dominican order, and on the Spanish invasion of Italy, in 1525, went to France, and obtained the bishopric of Agen, which he resigned in 1555, dying in 1562. He wrote a great many verses, and several novels of a licentious description in the style of Boccaccio. Shakespeare, Massinger, and Beaumont and Fletcher derived some of the incidents of their plays from him.

Band-fish, the popular name of any fish of the genus Cepola, constituting a family of Blenniiform Acanthopterygian fishes. Body very elongated, compressed, and covered with minute cycloid scales; there is one very long dorsal fin, which, as well as the anal, is composed of soft rays; ventral fins thoracic of one spine and five rays; eyes large; lower jaw frequently the longer. They are serpentiform marine fishes, of delicate structure, 15 to 20 inches long, belonging chiefly to the north temperate zone, and in the Indian Ocean extending southward to Penang. One species, *C. rubescens*, is European, common in the Mediterranean (where, from its red colour, it is known as the Red Riband and the Fire-flame), and sometimes occurring on the British coast. Band-fishes are said to feed on seaweed and small crustaceans, and are preyed upon by cod. They are valueless as food fish.

Bandicoot, any animal of the genus Perameles, typical of the family Peramelidæ, to which the

BANDICOOT (*Perameles*).

popular name is sometimes extended, and which contains two other genera, Macrotis [NATIVE RABBIT] and Chœropus (q.v.). The Bandicoots proper, distributed over Australia, Tasmania, New Guinea, and some of the neighbouring islands, are small marsupials, about the size of rabbits, with long slender head, ovate pointed ears, short harsh fur, rather short tail, pouch complete and opening backwards. The fore limbs have each five digits, but only the middle three are well developed, the outer ones being rudimentary; the hind feet have a rudimentary inner toe, the second and third are slender and joined, but with distinct claws, the fourth is well, and the fifth moderately, developed. The species are entirely terrestrial, making nests of grass and sticks in hollow places on the ground, and feeding chiefly on roots and bulbs varied with insects and worms.

Bandicoot Rat (*Nesokia bandicota*), a gigantic rat, distributed over the Indian and Malay peninsulas. Above it is hairy and black, the lower surface inclining to gray. A female, figured in the *Transactions of the Linnæan Society* (vol. vii.), measured 26¼ inches, of which the tail was 11 in., and weighed 2 lbs. 11½ oz. The male is larger, and has been known to weigh 3 lbs. It is a most mischievous and destructive animal, preying on grain and vegetables, and if these are scarce attacking poultry. The name "bandicoot" is a corruption of Telinga *pandikoku* = Pig Rat, by which name the animal is sometimes known.

Bandiera, ATTILIO and EMILIO, two brothers, born at Venice in the years 1810 and 1815 respectively, of distinguished family, and entered the Austrian navy, in which their father served as an admiral. Animated by the keenest patriotism, and detesting their father's acquiescence in foreign domination, they put themselves in correspondence with Mazzini, then in London. Their letters were opened, and attempts were made to conciliate them, but they escaped from Venice to Corfu, and thence, with twenty companions, landed in Calabria in the hope of stirring up an insurrection. This expedition proved a failure; the brothers, with seven others, were captured, and shot at Cosenza in 1844.

Bandinelli, BARTOLOMMEIO, or BACCIO, born at Florence in 1487, attained eminence as a sculptor, and received the patronage of Cosmo de Medici, Clement VII., and Francis I. He was influenced in all his work by deep-rooted envy of Michael Angelo, whom he never approached save in one composition, the *Descent from the Cross*, a bas-relief, now in Milan Cathedral. His most ambitious attempt was the group of *Hercules and Cacus*, intended to rival the great master's *David*. Some admirable productions of his may be seen at Florence, in the cathedral and elsewhere. He achieved some success as a painter, but was less happy as an architect. He died in 1559.

Bandon, the name of a river and town in County Cork, Ireland. The river rises in the Carbery Mountains, and after a course of 40 miles flows into the bay of Kinsale, where it forms a harbour. Spenser mentions it as "pleasant Bandon, crowned by many a wood." The town, sometimes called Bandonbridge, is on the river, 13 miles from Cork, and has a bridge of six arches. It is a

well-built town of stone, with good public edifices. The chief industry is dyeing, especially in blue.

Bands. [MILITARY BANDS, ORCHESTRA.]

Bands, the name given to the pendants of white linen or other material worn by the clergy, lawyers, and in academic dress. They are now seldom worn by Church of England clergymen, but were at one time very common.

Banff, a port and royal borough, the capital of Banffshire, Scotland. It is a well-built town, with a good harbour, protected by a castle at the mouth of the river Deveron, which is crossed by a bridge of seven arches. The public buildings are excellent, among them being the hospital founded by Alexander Chalmers. On the opposite side of the river is Macduff, the seat of a thriving shipping trade. Archbishop Sharp was born here. Together with Elgin and five other towns, it sends a member to Parliament. Pop. (1901), 7,136. The county has an area of 686 sq. m. It returns one member to Parliament. The soil is mostly fertile and well tilled, but cattle-breeding is more profitable than agriculture. The Spey and the Deveron abound with salmon, and herrings are plentiful off the coast. Some of the mountains are of great height, and yield marbles, granites, limestones, crystals, and topazes. Yarns, linens, and woollen goods are manufactured; and the distilleries of Glenlivat are celebrated. Pop. (1901), 61,488.

Bangalore, the administrative capital of Mysore, a native state of Southern India, under the supervision of a British Commissioner. It stands at an elevation of 3,000 feet above sea-level, and enjoys a splendid climate, in which the vegetables and fruits of Europe are easily reared. The old fortifications no longer exist, but a considerable force occupies the cantonments. The town is well-built, and prettily laid out with delightful gardens. The district takes its name from the town, and from 1834 to 1881 was completely under British rule, but the native rajahs have now been restored with restricted power.

Bangâsh, a branch of the Afghans, inhabiting the Miranzai, Kohat, and Kûrani valleys, traditionally from Seistân, though, according to others, driven hither in the 13th century by the Ghilzais of Gardez. Three main divisions: Miranzai, with eight khels; Baizae, with six khels; and Sâmalzae, with five khels.

Banghîs (BANGHYAS), a low-caste people widely spread throughout Bengal and other parts of the Ganges valley, and as far west as Sindh. In the North-West Provinces the term is equivalent to *paria*, being applied indifferently to the Kôls, Dhêrs, Ramussis, and other low-caste communities grouped about the outskirts of the large towns. There is also an Afghan tribe, Banghi, in the hills north of Kâlâbâgh on the Indus. Two divisions: Abi Khel and Tarka.

Bangkok, the capital of the kingdom of Siam, is situated on both banks of the river Menam, about 20 miles from the sea. The houses are of wood, and built chiefly on piles; many are erected on great rafts that line the river, and canals intersect the streets. The royal palace stands on an island, and within its high walls are enclosed the chief offices of state, barracks for many soldiers, and the quarters of the famous White Elephant. Handsome Buddhist temples adorn the city, which is fortified, though the suburbs extend for miles beyond the defences. England and other European powers maintain consuls and a consular court, and there are many trading firms established here, pepper, cardamoms, sugar, rice, tin, and timber being the chief exports.

Bangle, an ornamental ring worn on the arms and ankles in India and Africa. The term is now commonly applied to any bracelet without a clasp.

Bangor (Welsh *White choir*), a market town in the county of Carnarvon, North Wales, near the northern entrance of the Menai Straits, and having the port, Penrhyn, on the adjacent coast. The old street winds its way through a narrow and picturesque valley, but a modern quarter has recently sprung up. Bangor became the seat of a bishopric in the sixth century, and the existing cathedral, an embattled cruciform building with a low tower, was erected on the site of the ancient structure, and completed in 1532. The chief source of trade is found in the slate quarries of Llandegai, six miles distant, but many strangers are attracted in summer by the natural beauty of the locality. For parliamentary purposes Bangor is incorporated in the Arfon division of the county. The University College of North Wales was opened here in 1884. Pop. (1901), 11,269.

Bangor, a port and chief town in the county of Penobscot, State of Maine, U.S.A. It is 60 miles from the sea on the Penobscot river, which is navigable for the largest vessels, and a large trade is done in timber.

Bangorian Controversy, in the history of the Church of England, an offshoot of the conflict with the NONJURORS (q.v.). Bishop Hoadly, a Whig, became Bishop of Bangor in 1715, and in opposition to Dr. Hickes, a Nonjuror, who charged the Church of England with schism, he affirmed that communion with a visible church was not essential to the Christian profession. A sermon of his preached before George I. in 1717 provoked an appeal to Convocation, but, to avoid a conflict between the bishops, who mostly sympathised with Hoadly, and the clergy, who commonly agreed with Hickes, the king prorogued that body, and it did not meet again till the reign of Queen Victoria. William Law, the author of the *Serious Call*, took a prominent part against Hoadly.

Bangor-is-Coed, a village in N. Wales, on the Dee, about 5 miles S.E. of Wrexham. The monastery which once existed there was the oldest in Britain, having been founded before 180 A.D.

Bangsring, BANXRING, any animal of the insectivorous genus Tupaia, with seven species, typical of the family Tupaidæ, and most abundant in the Malay Islands and Indo-Chinese countries, but with one species in the Khasia Mountains and

one near Madras. They are squirrel-like shrews, with bushy tails, generally arboreal, but also feeding on the ground and among dwarf bushes. The genus Hylomys (two species), in which the tail is shorter, ranges from Tenasserim to Java and Borneo. [PTIZOCERQUE.]

Bangweolo, LAKE, is in Central Africa (long. 28° E., lat. 12° S.), and was discovered by Livingstone about 1868, lying nearly due S. of Tanganyika, and W. of Nyassa. It receives the river Chambezi (not Zambesi) from the N.E., and sends its overflow through the Luapula to the Congo. It is also called Bemba.

Banialuka, a town and fortress in Bosnia, Turkey in Europe, now under Austrian protection. It is situated on the river Verbas, and there are silver mines in its neighbourhood.

Banian Days, fast days; days when no meat is to be eaten. The term is derived from the Banian merchants. [BANYANS.]

Banim, JOHN, born at Kilkenny in 1798, started in life as a drawing master, but, migrating to Dublin, he wrote in conjunction with his brother, Michael, a series of powerful novels, *e.g. Tales of the O'Hara Family*, *The Croppy*, and *Father Connell*, describing the darker side of Irish life. His health broke down and poverty ensued, from which he was rescued by a public subscription raised by the English press, and by a Government pension. He died in 1842.

Banishment, expulsion from any country or place by the judgment of some Court or other competent authority. The term has its root in the word "ban." Banishment as a punishment is unknown to the ancient unwritten law of England, although voluntary exile in order to avoid other punishment has been at times permitted. The Crown has always, in certain cases, exercised its prerogative of restraining a subject from quitting the kingdom, but it is a legal maxim that no subject shall be sent out of it unless by authority of Parliament. It is declared by Magna Charta "that no freeman shall be exiled unless by the judgment of his peers, or the law of the land." There are, however, some instances of banishment of an obnoxious subject by the authority of the Crown alone; and in the case of Parliamentary impeachment for a misdemeanour, perpetual exile has formed part of the sentence of the House of Lords, with the assent of the Crown. Aliens and Jews (formerly regarded as aliens) have also often been banished by royal proclamation. Banishment as a punishment was introduced by a statute passed in the thirty-ninth year of the reign of Queen Elizabeth, by which it was enacted that "such rogues as were dangerous to the inferior people should be banished the realm." At a much later period the punishment of transportation was sanctioned by the legislature. [TRANSPORTATION.]

Banjari (BRINJARRI), a nomad non-Aryan people, Central India, driven from Mewar southwards by the Rajputs in the sixth century, have always been the carriers and caravan conductors of this region, and enjoy a reputation for honesty above suspicion; tall, aquiline nose, long hair worn in ringlets, ruddy bronze complexion, muscular frames, by many regarded as the primitive stock of the Gypsy race. In Sindh the term Banjari is equivalent to Jât, and is there applied to the Gypsy class, but they call themselves Gohar, and are divided into tandahs or tribes, governed by naiks (chiefs) with patriarchal authority.

Banjarmassin, a district and its capital town in the S.E. of Borneo, since 1860 under Dutch protection. The former has a length of 350 miles, and a breadth of 270, being in the main flat, though traversed by a lofty ridge. It is watered by the Banjar and the Nagara, and produces cotton, rice, pepper, besides gold, iron, coal, and diamonds. The town is on the Banjar about 15 miles from its mouth, and on account of floods is built on piles or rafts. Chinese form a large proportion of the population.

Banjo (a corruption of Portuguese *bandore*, the name of a variety of the ZITHER), a form of guitar with a circular body covered with tightly-stretched parchment, and from five to nine strings. It is the characteristic instrument of the negroes of the United States, but has become popular elsewhere.

Bank (from Ital. *banco*, a bench or money-changer's table), an institution for receiving and lending money, and in some cases for issuing paper money. [BANKING.] The term is also applied in certain games of chance.

Bank Holidays were established by statute throughout the United Kingdom in 1871, to a great extent through the agency of Sir John Lubbock. A bill of exchange due on any of them is not payable till the day following. In England and Ireland the days are: Easter and Whit Monday, the first Monday in August, and the day after Christmas Day (or the next day, should the day after Christmas be Sunday). Good Friday and Christmas Day were already observed as bank holidays in England and Ireland before the passing of the Act. In Scotland the days it specified are, Christmas Day, New Year's Day, Good Friday, and the first Monday in May and August.

Banking. The business of banking consists in trading in money by receiving, lending, and exchanging it. A bank (A.S. *banc*, Ital. *banco*, a bench, a table) is an office or building in which the business of banking is carried on, the term being also extended to any body of persons engaged in such pursuit. A banker is a person conducting this business, sometimes individually, but more frequently in partnership with others. The business of banking has developed from that of mere money-lending and money-changing.

The earliest bank on record was kept by Egibi, at Babylon, about 700 B.C.

The Greek Trapezitæ, or money changers, and the Roman publicani probably received deposits and made advances, but do not appear to have known the use of bank-notes. Cicero, however, remitted money from Cilicia to Rome through a firm of publicani. These publicans (a much higher class than those mentioned in the New Testament) did

mercantile as well as financial business. Both classes derived their name from their contracting to collect certain of the provincial taxes.

Among the earliest banks in modern Europe was that of Venice, founded 1157, for state purposes. The *Bank of Barcelona*, the earliest existing bank, was established in 1401, although banking had been previously carried on by the cloth merchants of that city. Some of these early European banks were finance companies, established to raise money to lend to the government.

The *Bank of Amsterdam*, founded 1609, for purely commercial purposes, was instituted on account of the debased nature of the coinage. Merchants having payments to make were obliged to offer coins of different nations, some of them being greatly worn, others clipped and otherwise reduced in value. These coins therefore were paid into the bank, weighed, and credit given for their intrinsic value. This bank was one of deposit, and did not profess to advance money, but to keep all the coins deposited in its vaults. The only profit derived consisted in charges upon its customers, such as transfer fees, for transferring credits from one account to another.

The *Bank of Stockholm*, established 1688, was the first in Europe to issue notes. The Jews were the first English bankers. They came to this country soon after the Conquest. By dint of much labour and carefulness of living they became very rich, making use of their money by lending it at a high rate of interest to the aristocracy. After much persecution they were eventually banished from the country in the time of Edward I., and were replaced by the Lombards. In addition to being bankers, these latter were goldsmiths and pawnbrokers.

After the seizure by Charles I. of the sum of £200,000 belonging to the London merchants, and placed for security in the Tower, in the custody of the Master of the Mint, they deposited their money with the goldsmiths, who issued transferable receipts, which were called goldsmith's notes. Francis Child, one of their number, found banking so profitable that he relinquished the other branches of his business. Many others followed his example, and thus laid the foundation of modern banking.

Although banking exists primarily for the sake of profit, the advantage accruing to the public is incalculable. It would be simply impossible to carry through the business of the present day without the use of substitutes for coin in the form of notes, bills, and cheques. It is, in fact, largely to the use of these that England owes her present commercial position. To the private individual the advantage is no less great. He feels a stronger sense of security in placing his money with a banker than in keeping it under his own care, or investing it in any enterprise of doubtful character.

A banker will allow interest for money which the depositor may have no means of otherwise employing, and this acts as a further inducement to a person to place money in his hands.

Banks may be thus classified: public or state banks, joint-stock banks, and private banks. The first are called public, being established for national purposes. They in some instances owe their origin to the debts of the State. Joint-stock banks are those which conduct their business in a corporate capacity, while private banks are of the nature of a common partnership, consisting of a limited number of partners.

Capital is the first consideration in banking. The capital of a public bank generally takes the form of a loan from the public to Government for State objects; that of a joint-stock bank being derived from the joint contributions of several persons. The capital of a private bank is furnished from the private means of the partners themselves.

But it is not with capital alone that the banker trades, since in the course of business he receives deposits, which, so long as they remain in his hands, are equivalent to capital. There are two classes of deposits, those *at call*, that is repayable on demand, and those placed at interest, repayable after due notice. The former kind are termed *current* accounts, kept by people in business, who pay in their daily receipts, as well as by independent persons, who pay in sums received, such as payments for rent, dividend warrants, etc. The latter kind of accounts, termed *deposit* accounts, are kept by persons having no immediate use for their money.

It is not usual for a banker to allow interest on current accounts, by reason of the trouble incurred in keeping them. Besides which, the money on such accounts being liable to withdrawal without notice, cannot be invested to the same advantage as money on deposit account. The rate of interest allowed on deposit accounts varies according to circumstances, better terms being sometimes obtainable if the length of notice agreed upon be greater than usual, or if the amount be exceptionally large. The usual rate of interest allowed in London depends upon the Bank of England rate of discount; generally it is 1½ per cent. less. In the present state of affairs joint-stock banks pay from 10 to 15 per cent. dividend to their shareholders, but only allow their depositors from 2 to 4½ per cent. Although at first sight this seems unfair, the reason is not far to seek. In the first place, the shareholders take all the risk of the business; secondly, they derive the profit from three sources, viz. those very deposits upon which they allow interest, those at call, and their own capital. A bank with a capital of £250,000 is able to receive deposits to £1,000,000, or even more, thus having a virtual trading capital of £1,250,000 upon which to make its profits. Receipts are issued for amounts placed on deposit account, which have to be produced before such money can be repaid. With current accounts no such receipts are given, but the amount of each deposit is entered in the customer's pass-book.

Money deposited with a banker at once becomes his property to apply to what purposes he sees fit. Thus the customer stands solely in the relation of the banker's creditor. The customer, in this relation, has frequent occasion for withdrawing money from the banker's hands in order to meet his obligations. This is effected by means of cheques, which are demand notes or orders drawn upon the banker for the repayment of money. They must bear the signature of the drawer, and must be drawn in unequivocal terms.

Cheques being peremptory orders to pay cash, it is incumbent on the banker to have always upon his premises such an amount of coin and notes as he is at all likely to be called upon to pay. It is obvious that the more money a banker keeps in reserve for this reason, the less he is able to lend or otherwise invest. His object is, therefore, to make the amount as small as possible, consistently with prudence.

In addition to keeping in reserve gold and notes, he invests a certain proportion of his deposits in such securities as will command a ready sale, in order that he may be enabled to realise gold for them in times of emergency. The reason of this is obvious, as for some reason perhaps beyond the banker's own control, there may be a very unusual demand by the depositors for the repayment of their money. If he is unable to satisfy all the demands of his creditors, his only alternative is to close his doors. This is called a suspension of payment.

The banker employs money entrusted to him in various ways—by means of discounting bills, and lending upon approved securities.

It often happens that when a person engaged in business buys goods he is not in possession of ready money to pay for them at the time of purchase. He is, therefore, said to buy the goods upon credit, and as it would be most unsatisfactory to the seller of the goods to allow the debt to run on for an indefinite period, and as a mere verbal promise to pay within a certain time would not be considered binding, he draws an order, or "bill," upon the buyer ordering him to make payment of the same within a certain definite time. This order is called a bill of exchange, and, if correct, the buyer signs his name across it, which signature is an admission of the debt, and is called an acceptance of the bill. But, although selling the goods on credit, the vendor frequently requires the money represented by the bill long before it is due; he therefore takes it to his banker in order that he may obtain immediate credit for the same. The banker is said to "discount the bill," by which term is meant that he buys it from the customer, and he gives credit for it for a less amount than the bill represents. The difference between the actual amount of the bill and the amount thus advanced is called the discount, or in other words interest on the amount for the length of time between the day of discounting the bill and its due date.

A banker should never discount a bill that does not represent an actual business transaction, as by so doing he frequently incurs serious losses. Such bills, drawn solely for the purpose of raising money by getting them discounted, are termed accommodation bills. It is difficult, however, to distinguish them from genuine bills.

As bills are sometimes not provided for by the acceptor, a banker is careful only to discount such bills as are likely to be met when presented for payment. For this purpose he makes himself acquainted as far as possible with the financial position of the acceptor. Neither will he discount bills for his own customer unless such customer's finances are in a satisfactory condition. And for this reason, that should a bill discounted by a banker be unpaid upon presentation, he charges his customer's account with the amount of the bill, which he returns to him.

Besides trade bills a banker discounts promissory notes signed by his customer, promising to pay a certain sum of money at the expiration of a definite time. But he always requires some other kind of security in addition to the mere promise to pay. The latter is termed collateral security.

Another method of lending money is by means of *loans*. In this case the borrower lodges securities with the banker, who has a right to sell the same if the amount advanced is not repaid at the stipulated time. Money should never be lent except upon good security, and such as can be readily realised.

The profit derived from the granting of loans depends very much upon the source from which the money is lent. Thus, for instance, it is plain that a greater profit must accrue if the advance be made from money upon which no interest is allowed, or from capital, than if drawn from deposits upon which interest is allowed; or, should the lending banker issue his own notes, the profit is greater still, as these latter, being only promises to pay, are lent instead of cash, and the longer they remain in circulation the better it is for the banker.

Another function in connection with banking is the remittance of money. This is accomplished not by sending cash from one place to another, but drafts, by which means the same purpose is served. The banker gives a draft in exchange for cash. This transaction is called an exchange. For instance, a person at Manchester wishing to remit money to London applies to a banker for a draft drawn upon his London agents, for which a small charge for commission is made, or the draft (for which ready money is given) is made payable at say twenty-one days after date, in which latter case the banker derives profit from the interest on the money for that period. Money may also be remitted to Manchester, and although London bankers cannot issue drafts upon country bankers, means are contrived by which the same purpose is effected, and business is so conducted that coin is seldom sent from place to place, except it be in large quantities.

In the course of business a banker receives a great many cheques and bills payable at other banks, and it therefore is his duty to collect payment for the same. This he does in various ways according to circumstances. Some are collected by clerks, some are presented through the post, while others are presented through the Clearing House.

The advantage of the Clearing House is the great economy it effects in the circulation of coin and bank notes. Thus each clearing banker having claims against the others sends every day one or more clerks to the House, who enter on sheets provided for that purpose the amounts of bills and cheques drawn upon the others and those drawn against their own office. At the close of each day a balance is struck and differences are adjusted by means of transfers on the Bank of England, with which each clearing banker keeps an account. The effect of this of course is that practically the whole banking reserve of the country is under the control of the Bank of England, which is a private company not under Government supervision.

Each country banker has a London agent, through whom the clearing of country cheques is also effected. The total sum which passes annually through the London Clearing House is enormous, amounting to more than £12,000,000,000. The establishment is managed by a committee, composed of representatives from among the leading bankers.

The *Bank of England* arose out of a loan of £1,200,000 to Government in the year 1694, and was established upon a plan proposed by Mr. W. Paterson, a Scottish merchant. In consideration of this loan a Charter was granted by William and Mary for eleven years, which Charter has been renewed from time to time, the last renewal being in 1844. The subscribers were thus incorporated as a bank, which was styled the Governor and Company of the Bank of England. The management and government of the corporation was committed to the governor and twenty-four directors, to be elected each year from among the duly qualified members. Business was commenced on the 1st of January, 1695, and notes were issued, none of which were for a less sum than £20. The Bank also discounted bills of exchange, charging from 4½ to 6 per cent. Payment was suspended in 1696, when bank-notes fell considerably in value. There was a heavy run upon the Bank in 1797, when cash payments were suspended, no payments being made except in bank-notes. They were not resumed till 1823.

By the Bank Charter Act, 1844, the Bank was divided into two departments, called the Banking Department and the Issue Department. By this Act the debt due from Government, £11,015,100, was said to be due to the Issue Department, and against this they were allowed to issue notes without holding any gold. They were also empowered to issue notes against securities now amounting to £5,184,900, making a total of £16,200,000 in notes against which no gold is now required to be held. Beyond this amount all notes issued must be represented by an equal amount of gold in the Issue Department.

The amount of Bank of England notes actually in circulation is about £25,000,000, but besides this the Banking Department holds another £10,000,000 in notes in exchange for which it has given gold. The Banking Department does not keep more gold than it requires (about £1,000,000), and can only obtain notes from the Issue Department in exchange for gold and *vice versa*.

But Government does not allow the Bank the whole benefit of the profit upon its issue of notes, but only that upon the issue against the Government debt and securities to the extent of £15,000,000. All profit beyond this goes to Government after deducting the expenses connected with their issue. The Bank also pays £180,000 to Government annually for its privileges and in lieu of stamp duties.

For the management of the National Debt the Bank receives £247,000 per annum. At the Issue Department of the Bank persons bringing gold bullion have a right to demand notes for the same at the rate of £3 17s. 9d. for every ounce of gold. By these transactions the Bank makes a profit of 1½d. per oz. or £15,000 per annum.

The Bank of England receives money on deposit, but allows no interest whatever the amount may be. It also discounts bills, but does not issue circular notes nor grant letters of credit. The Bank has two branches in London and nine in the provinces.

The *London and Westminster Bank* was established in 1834 in spite of much opposition from the Bank of England, which was jealous of the monopoly of joint-stock banking it had hitherto enjoyed in the metropolis.

Other banks soon followed (London Joint Stock 1836, Union 1837, London and County 1837), and recent years have seen a great increase in their number.

Banking in Scotland differs somewhat from English banking. There are no private banks, but all are joint-stock, and they issue their own notes, some of so small an amount as £1. A great feature of Scottish banking is the system of lending money by means of cash credits, in which case the banker becomes the creditor of the customer, who keeps an overdrawn account, and pays interest on the daily amount thus overdrawn. The *Bank of Scotland* was established by an Act of the Scottish Parliament in 1695. The Scottish banks have a note circulation of £5,000,000, against which they hold £4,000,000 in gold.

The *Bank of Ireland* was established by an Act of the Irish Parliament in 1782. It is very similar to the Bank of England, and like that bank does not allow interest on deposits. The total amount of Irish notes in circulation exceeds £6,000,000.

Note Issue. A bank note is not really money, but only a promise to repay on demand money that has been previously advanced. Nevertheless, bank notes have come to be regarded almost as gold itself, and pass from hand to hand as freely.

Notes issued by the Bank of England are legal tender except at the Bank itself. Country notes are not a legal tender, although they are a good discharge for debts if not objected to at the time. No bank is allowed to issue notes which was not issuing the same prior to the 6th of May, 1844, and any bank discontinuing to issue them is not allowed to resume the issue. A bank-note being a promise to pay, it is obvious that no person will accept it from a banker unless he believes he will be able to get cash for it on demand. Notes are put into circulation either as payment for cheques or in exchange for gold, or in making advances.

The *Bank of France*, founded 1800, placed on a solid basis 1806, is a commercial enterprise. It receives deposits, discounts bills, and issues notes. It is next in importance and magnitude to the Bank of England, and has a capital of 182,500,000 francs. It has made large advances to Government. It also has the monopoly of the bank-note issue for the whole of France. It has many branches throughout the country. Discounts are very numerous. It will discount bills upon three responsible signatures, such bills not being drawn at more than three months. It lends money on stocks, railway shares, and pawns, and charges no commission for keeping accounts. In 1848 it suspended cash payments. In 1857, after the war

with Russia, its capital was doubled. Its charter expires in 1920. The administration is vested in a council of 21 members, the governor and the two deputy-governors being appointed by the Government.

The *Imperial Bank of Germany* was founded 1875 with a capital = £6,000,000 sterling, and an uncovered paper issue of 250,000,000 marks. This issue may be increased if one-third of such increase be represented by cash in hand, and two-thirds in bills not having more than three months to run. Thirty-two other banks were recognised with a right to issue 135,000,000 marks in notes of the Imperial Bank, which issue might be exceeded if excess be covered in cash and 5 per cent. interest per annum be paid on the excess amount. This bank acts gratuitously for the State, which participates in profits after a minimum of 4½ per cent. has been paid to the shareholders.

The *Bank of Russia* was formed in 1856 after the costly Crimean war, with a capital of 25,000,000 roubles, supplied by Government. The capital and reserve of this bank is at the mercy of the State. It is well organised, but does not belong to itself. It has an inconvertible paper currency with no metallic reserve. It will discount bills with two signatures at six months' date.

The *Austro-Hungarian Bank* was founded in 1815, there being a deficiency in the exchequer owing to the war against France. It is the national bank. The capital, 110,000,000 florins, was supplied by the shareholders. It is very much hampered by loans to Government. The State does not participate in the profits. The governor is appointed by the Emperor. Although commissioned by Government this bank does not act for Government, which manages its own concerns like that of France.

The *Bank of the Netherlands* was founded in 1814 and issues notes, which privilege is exclusive. It has a president, secretary, and a commission to assist shareholders, and is supported by the State.

The *Bank of Belgium* (1850) is a national bank with a capital of 50,000,000 francs. The Treasury takes three-quarters of the profits after 6 per cent. has been paid to the shareholders.

In the *United States*, Congress passed an Act 1863-4 in order to allow banking associations, termed National Banks, to issue notes in the various States to the extent of 300,000,000 dols. They were to deposit *interest-bearing* bonds with the Treasurer of the United States, in exchange for which notes were given to the extent of 90 per cent. of the value of the bonds, the remaining 10 per cent. was laid by as security for the repayment of the notes. The practical result is that the banking reserve is invested in the National Funds, and controlled by the Treasury instead of by the Bank of England as with us. A similar system existed in Argentina, but this was abolished in 1891 and a new bank opened. The bank-note circulation in the United States is very extensive, some notes being for so small an amount as one dollar. Treasury notes are also issued against silver, for small amounts.

The Bank Charter Act of 1844 had for its main object the control of the bank-note circulation. It arose in consequence of the excessive issue of bank-notes, and the drain of gold from the country. The object of Government was to restrict the country note issue as well as that of the Bank of England, and also to take the control of the metallic reserve out of the hands of the directors.

Bank Notes act as a substitute for coin, as described under BANKING. Their manufacture necessarily involves elaborate precautions against forgery. Bank of England notes are printed with a peculiar ink on a specially made paper, very light, crisp, and tough, bearing a peculiar watermark. When once returned to the Bank, unlike the notes of a private banker, they are never reissued. They are defaced, in order to cancel them, but before being destroyed are kept for a term of years in case it should be necessary to find out through whose hands they have passed while in circulation. Since 1855 they have been printed from electrotypes. Scotch and foreign bank notes are usually partly printed in coloured inks, two or more shades being used in the same note to make forgery more difficult. In the United States the additional precaution is taken of using methods of engraving which can only be carried out by elaborate and expensive machinery.

Bankruptcy, the term applied to the affairs of a person who has been judicially held insolvent. There is a special code of laws applicable to bankruptcy, and a court for their administration known as the "Court of Bankruptcy," which was constituted in the early part of the reign of William IV., but there were bankrupt laws as far back as the reign of Henry VIII.

Bankrupt law has been repeatedly altered, but up to the present time it has not given complete satisfaction in any direction. Formerly traders alone were subject to become bankrupt, but by the last and prevailing statute on the subject, the Bankruptcy Act, 1883, *any debtor* is brought under its jurisdiction. The following is a summary of the provisions of this important Act.

1. *Acts of Bankruptcy.* A debtor commits an act of bankruptcy (*which is the foundation of the jurisdiction*):—(*a*) If he makes a conveyance or assignment of his property for the benefit of his creditors generally. (*b*) If he makes a fraudulent conveyance, gift, delivery, or transfer of his property, or of any part of it. (*c*) If he makes any conveyance or transfer of his property, or any part of it, or creates any charge on it, which would be void as a fraudulent preference if he were adjudged bankrupt. (*d*) If with intent to defeat or delay his creditors he has left England, or being out of England has remained abroad or otherwise absented himself, or begun to keep house (*i.e.* been hiding). (*e*) If execution issued against him has been levied by seizure and sale of his goods under process in any court. (*f*) If he has filed in the court a declaration admitting his inability to pay his debts, or has presented a bankruptcy petition against himself. (*g*) If a creditor has obtained a final judgment against him, and execution on it not having been stayed has served on him a bankruptcy notice under the Act requiring him to pay the debt in

accordance with the terms of the judgment, or to secure or compound for it to the satisfaction of the creditor or of the court, and he has not within a stipulated time after service of the notice either complied with the requirements of the notice or satisfied the court that he has a counter-claim, set-off, or cross demand equalling or exceeding the amount of the judgment debt, and which he could not set up in the action in which the judgment was obtained; and (*h*) if the debtor has given notice to any of his creditors that he has suspended or is about to suspend payment of his debts. [ASSIGNMENT, EXECUTION, JUDGMENT.]

2. *Petition.* Any of the above acts or neglects are sufficient to found a petition for a receiving order, but the act or neglect must have occurred within three months (formerly six months) before the presentation of the petition. The debtor may petition himself, or any single creditor whose debt amounts to £50, or any two or more whose debts in the aggregate amount to that sum. The petition is on oath, and may be filed in the High Court or county court, the choice of court depending on the previous residence and place of business of the debtor.

3. *Receiving Order.* Upon the hearing of the petition, unless it be dismissed, a receiving order is made and notice thereof transmitted to the official receiver and to the Board of Trade, and it is also advertised. A general meeting of the creditors (known as the first meeting) takes place soon afterwards to consider whether the debtor shall be made a bankrupt or not. [COMPOSITION.]

4. *Adjudication.* The creditors at such meeting or any adjournment thereof may determine that the debtor be adjudged bankrupt, or if no such resolution is passed, or the creditors do not meet, the debtor is adjudged bankrupt, and his property vests in the official receiver. The bankruptcy is deemed to have relation back and to commence at the time of the act of bankruptcy on which a receiving order has been made; or if there be more acts than one, then to have relation back to the first act of bankruptcy proved to have been committed within three months next preceding the presentment of the petition. Certain transactions with the debtor are, however, protected though taking place within the period covered by the relation back. These are (1) any payment by the bankrupt to any of his creditors; (2) any payment or delivery to the bankrupt; (3) any conveyance or assignment by the bankrupt for valuable consideration; and (4) any contract, dealing, or transaction by or with the bankrupt for valuable consideration, provided that the two following conditions be complied with:—(A) The transaction must have taken place before the date of the receiving order; and (B) The person (other than the bankrupt) party to such transaction must not at the time have had notice of any available act of bankruptcy committed before that time. Also as regards executions against the goods or the lands, or against property in the hands of a third party [ATTACHMENT, ELEGIT, FOREIGN ATTACHMENT], they are by the Act held good *if perfected* before the date of the receiving order, and before notice of the presentation of any petition by or against the debtor, and of the commission of any act of bankruptcy by him.

5. *Duties of Trustee. Dividends.* The trustee's duties consist in realising and distributing the property of the debtor, and he is from time to time to declare dividends amongst the creditors; he is required to pay into such local bank as the committee of inspection shall appoint, or failing such appointment, into the Bank of England all sums from time to time received by him. As regards the payment of dividend, the Act directs that subject to the retention of such sums as may be required for costs of administration, or otherwise, the trustee is to distribute dividends amongst the creditors who have proved their debts, and the first dividend (if any) shall be distributed within four months after the conclusion of the first meeting of creditors, unless the trustee gives sufficient reason to the committee of inspection for postponement; subsequent dividends shall, in the absence of sufficient reason to the contrary, be declared and distributed at intervals of not more than six months. When the trustee has realised all the bankrupt's property, or so much thereof as can, in the opinion of himself and the committee of inspection, be realised without needlessly protracting the trusteeship, he is to declare a final dividend, giving previous notice to the persons whose claims to be creditors have been notified to him, but not established to his satisfaction, that if they do not establish their claims to the satisfaction of the Court under a certain limited time he will proceed to make a final dividend without regard to such claims. If any surplus remains after paying every creditor in full with interest where that is allowed, and after paying all costs of administration, such surplus belongs to the bankrupt.

Dividends are paid rateably among all the creditors without regard to their quality—hence judgments and recognisances and other debts by record or specialty are on the same level with debts by simple contract, and equitable debts rank with legal debts in the same way. But a creditor holding a specific security on part of the bankrupt's property is entitled, notwithstanding the bankruptcy, either to surrender his security and prove for his whole debt, or to realise the security or give credit for its value, and to receive a dividend rateably with the other creditors in respect of the surplus of his debt remaining unpaid. So a landlord distraining for rent after the bankruptcy has occurred may make such distress available to the extent of one year's rent accrued prior to the adjudication, though for the remainder he must come in with the other creditors. A priority is also given to rates and taxes to the extent of one year's assessment, and wages to the extent of £50 in respect of services rendered by clerks or servants, and accrued during four months preceding the date of the receiving order, and also to any labourer or workman to the extent of £25 for services rendered during two months before the receiving order. These must be paid in full and in priority to all others if the estate is sufficient, but they abate if the property is insufficient. With these exceptions

all debts provable under the bankruptcy are to be paid *pari passu*. Unliquidated damages arising on a contract, promise, or breach of trust are not provable in bankruptcy.

6. *Statement of Affairs. Committee of Inspection.* Within seven days from the date of the receiving order, if on a creditor's petition, and within three days if on the debtor's own petition, the debtor is to submit to the official receiver a statement of his affairs, and as soon as possible after such receiving order has been advertised the official receiver summons a general meeting, called the first meeting of the creditors, of which seven days' notice is given in the *London Gazette*, and in a local paper, and he transmits to the creditors mentioned in the statement of affairs a summary of such statement, and at such meeting the creditors, if they have first resolved that the debtor shall be made bankrupt, appoint some creditor, or other proper person, to fill the office of trustee of the bankrupt's property, and they appoint from the creditors proper persons (not less than three in number, nor more than five) as a committee of inspection, to superintend the administration of the bankrupt's estate. The first meeting is usually presided over by the official receiver, or his nominee, in whom the property vests from the date of the receiving order, until some one else is appointed. Debts can be proved at this or any other meeting, and no person can vote either at the first or any subsequent meeting till he has proved his debt in the prescribed form.

7. *Management of Estate.* It is the duty of the creditors' trustee to use his best exertions in the management of the estate up to the close of the bankruptcy, and until the bankrupt has obtained his discharge. For this purpose he calls meetings of the creditors to ascertain their wishes, and, if necessary, he applies to the court for directions relating to any special matter occurring. He should also, as the bankruptcy proceeds, consult the committee of inspection as to his proceedings, and he has power by the Act to sell all or any part of the property by public auction or private contract; to give receipts for purchase moneys, which effectually discharge the purchaser; to prove, rank, claim, and draw a dividend in respect of any debt due to the bankrupt; to exercise any trustee powers under the Act, and to execute powers of attorney, deeds, and other instruments, for the purpose of carrying into effect the provisions of the Act, and to deal with any property in which the bankrupt is beneficially entitled as tenant in tail, in the same manner as the bankrupt might.

He may also, with the consent of the committee of inspection, carry on the business of the bankrupt so far as necessary for winding up; bring or defend actions, or other legal proceedings relating to the property, and compromise same. He may also employ the bankrupt to superintend the management of the property, making an allowance to him for his support, or in consideration of his services.

8. *Examination of Bankrupt.* The court, at the expiration of the time for the filing of the statement of affairs, holds a sitting for the bankrupt's examination (called his "public examination") and notice is given by advertisement in the *London Gazette* and a local paper; any other examination by the court is usually before a Registrar at chambers. The court has power to adjourn from time to time, and it is the duty of the bankrupt to answer all questions put to him by the court or any creditor. A note of the examination is signed by the bankrupt, and is open to the inspection of creditors, and may be used against him in evidence. The court, when satisfied of the completeness of the investigation, makes an order declaring that his "public examination" is concluded, but this order cannot be made until after the day appointed for the first meeting.

A bankrupt is subject to prosecution, as for a misdemeanour, if he fail to disclose the whole of his estate, or to deliver up all property in his control, also all books; if he conceals or removes any part of his property, or makes a material omission in the statement of his affairs, or mutilates or falsifies any book or document relating to his affairs.

9. *Order of Discharge.* At any time after the adjudication the bankrupt may apply to the court for an order of discharge, and this application is heard in open court as soon as his public examination is finished; and the court may grant an absolute order of discharge, which releases him from all liabilities provable under the bankruptcy, except only those incurred by fraud, or fraudulent breach of trust, or such as are due to the Crown, or incurred for some offence against the revenue laws, or as estreated bail for any person charged with such offence, and the bankrupt is thereupon entitled to all future acquisition of property. The court may, however, refuse an absolute order of discharge, and may suspend the same for a specified time on certain conditions, and the court is bound to refuse his discharge in all cases where he has been guilty of a misdemeanour of the class specified. The principal other grounds of refusing or suspending his order of discharge are: 1, that he has not kept proper books of account; 2, that he has continued to trade after knowing he was insolvent; 3, that he has contracted debt without reasonable expectation of being able to pay; 4, rash and hazardous speculation; 5, the putting any of his creditors to expense by vexatiously defending any action properly brought against him; 6, undue preference of any particular creditor; 7, previous bankruptcy or arrangement with creditors; 8, fraud or breach of trust. Formerly, and under previous statutes, the order of discharge was dependent upon the bankrupt paying a dividend of not less than 10s. in the £ (except under special circumstances). It is not so now. [COMPOSITION.]

In Scotland "Sequestration" is analogous to bankruptcy in England, and the rules and procedure are pretty nearly the same; but there is no Court for their administration. The sheriffs of counties award sequestration, a judicial factor is thereupon (if necessary) appointed, and acts until the appointment of a trustee, and the creditors nominate commissioners to advise with him in the administration of the estate.

In the United States each State can regulate its Bankruptcy and Insolvency Law subject to the paramount jurisdiction conferred on Congress by the Constitution. There are several Federal statutes

dealing with the general doctrines of bankruptcy, bankruptcy offences, and the constitution of Bankruptcy Courts, the last of which was passed in the year 1878.

Banks, SIR JOSEPH, botanical collector, was born in 1743. He was educated at Harrow, at Eton, where he acquired a taste for botany, and at Christ Church, Oxford. Having ample private means, he devoted himself to travel, visiting Newfoundland and Labrador in 1764 to collect plants and insects, and taking Solander, a pupil of Linnæus, with him on Cook's first voyage round the world between 1768 and 1771. In 1772 they went to Iceland, the Hebrides, and Staffa, the structure of which Banks was the first to describe. From 1778 till his death in 1820 Banks was President of the Royal Society; in 1781 he was created a baronet, and in 1795 a Knight of the Bath. He bequeathed his valuable library and herbarium to the British Museum.

Banks, THOMAS, born at Lambeth in 1735, was brought up as an architect, but took to sculpture, and won in 1770 the gold medal of the Royal Academy, being sent, moreover, to Rome to finish his education under Capizoldi. Returning in 1779, he met with so little encouragement that he went to Russia, and found a purchaser for his *Psyche* in the Empress Catherine. His *Mourning Achilles*, now in the hall of the British Institution, attracted notice at home: he was elected to the Academy, and after a few years of prosperity died in 1805.

Banksia, a genus of *Proteaceæ*, natives of Australia and Tasmania, named by the younger Linnæus after Sir Joseph Banks. They include some trees, but are mostly shrubs with leathery leaves very variable in form, with serrate or spinous margins, and white or red under-surfaces. The flowers are crowded together in heads, and yield much honey, and the fruits are follicles containing black winged seeds. There are over fifty species, many of which are greenhouse favourites.

Bankurah. [BANCOORAH.]

Bann, a river in Ireland which rises in the Mourne mountains, Co. Down, and after a course of 35 miles falls into Lough Neagh, as the Upper Bann. Emerging from the Lough the Lower Bann divides Co. Antrim from Co. Londonderry, and discharges itself into the Atlantic a little S.W. of Portrush, the town of Coleraine being near the mouth. The salmon fisheries are valuable.

Bannar (BAHNAR), a hill tribe, Cochin China, N. of the Charais, lat. 14° to 15° N., of reddish complexion, speech akin to that of the Stiengs and Sedongs; they occupy over 100 villages, with total population 25,000.

Bannatyne Club, the name given to a club formed in Edinburgh in 1823 to print works of interest relative to the history and literature of Scotland. It was named from G. Bannatyne, who in 1568 preserved the literature of the 15th and 16th centuries. Sir Walter Scott founded the club, which numbered among its members Laing, T. Thomson, and Lord Cockburn.

Banner. This word, which custom has very nearly rendered interchangeable with the word "flag," really means only the square flag bearing the arms of the owner, whose rank governs its size. Anciently, it was used in battle, when each squire assembled his retainers under his own; but nowadays the only usage of banners appears to be at funerals, city processions, upon mansions, and over the stalls of each Knight of the various Orders.

Banneret. The degree of Knight-Banneret, though dating certainly from the reign of King Edward I., is now fallen into disuse, and has been so for some time past. The honour, which was most highly esteemed, was conferred on persons especially distinguished for their bravery and gallantry in action, by the king in person, at the head of the army drawn up in battle array beneath the royal banner displayed, in the presence of all the officers and nobility of the Court, on the occasion of a glorious victory. A knight-banneret took precedence of all baronets (except when not created by the Sovereign in person), and was allowed the privilege of using supporters with his armorial bearings.

Bannerman, SIR HENRY CAMPBELL-. [CAMPBELL-BANNERMAN.]

Bannockburn, a village on the river Bannock, Scotland, three miles from Stirling. Here, on June 24, 1314, the English under Edward II. were completely defeated by Robert Bruce, and Scotland reasserted her independence. At Sauchieburn, close by, James III. of Scotland was defeated by his rebellious subjects in 1488. The village has manufactories of tartans, carpets, and nails.

Banns, a publication or edict whereby something is commanded to be done or forbidden. It is more particularly applicable to notices of intended marriages. By the statute 4 Geo. IV. c. 76 they are to be published in an audible manner in the parish church, or in some public chapel of or belonging to such parish, wherein the persons about to be married shall dwell—according to the form prescribed by the rubric prefixed to the "Office of Matrimony" in the Book of Common Prayer—upon three Sundays preceding the solemnisation of the marriage, during the time of morning service—or of evening service if there shall be no morning service in such church or chapel upon the Sunday upon which such banns shall be so published—immediately after the reading of the second lesson. But by a licence from the spiritual judge, or a registered certificate, the above formalities may be dispensed with. If persons be married without either publication of banns or licence, the marriage will be void and the officiating minister liable to penal servitude. If the marriage does not take place within three months after publication of the banns, the marriage shall not take place until the banns shall have been republished on three several Sundays, unless it be a marriage by licence or certificate, which two latter alternatives, however, must be acted upon within the three months. A clergyman refusing, without adequate cause, to perform the ceremony is liable to an action. In Scotland the law is different as to the effect of

non-publication of banns. Marriage in Scotland without publication of banns is valid. In the United States banns have been almost entirely superseded by the marriage licence; in some States even this is not necessary. Each State has entire authority and jurisdiction over its own citizens on the subject of marriage.

Banshee (Irish, *a female fairy*). In Ireland and parts of Western Scotland and Brittany a Banshee is believed to attach herself to some particular family, and foretell by her appearance the approaching death of one of its members.

Banswara, a small native state and its capital to the W. of Central India, and under the Mewar agency of Rajputana. The town is about 110 miles N.E. of Baroda, is encircled by obsolete mud walls, and contains a palace and several temples.

Bantam, or BATAN, formerly the large and flourishing capital of a district of the same name in Java. The unhealthiness of the climate led the Dutch to transfer the trade elsewhere in 1816, and a fire completed the work of decay. The harbour is now silted up and useless. The dwarf fowls now familiar in Europe were supposed to have been imported thence.

Bantam, a name given to any diminutive breed of the domestic fowl in the belief that they originally came from Bantam in Java, though they are probably Japanese in origin. The term is now applied to diminutive fowls without any reference to breed. The older strains of Bantam fowls are:—The Black, the White, the Cochin, the Cuckoo, the Japanese, the Nankin, Game, and the Gold and Silver Laced, or Sebright Bantams, in which last the fowls have the laced feathers of the Polish, and the distinctive male plumage is absent in the cocks. But all the large varieties of poultry have now been bred down to the diminutive or "Bantam" form.

Banteng (*Bos sondaïcus*), a species of wild cattle, ranging from Cochin China through the Malay Archipelago to the islands of Bali and Lombok. In colour and size it closely resembles the Gaur (q.v.).

Banting, MR. WILLIAM, a London merchant, published in 1863 an account of the diet he had found effectual in reducing his own dimensions. The use of lean meat and the avoidance of sugar and starchy foods were its chief features. The subject made a considerable stir for some time. Popularly, his name was treated as a participle from the imaginary verb "to bant."

Bantry Bay, a deep inlet on the south-west coast of Ireland. Here, on May 1st, 1689, Admiral Arthur Herbert, with twenty sail of the line, discovered the French Admiral, Châteaurenault, with twenty-four. The fleets engaged outside the bay, and although Herbert got slightly the worst of the encounter, he was, on his return to England, created Earl of Torrington, while two of his captains, Ashby and Shovell, were knighted. Here, too, in 1796, a French fleet anchored in order to support the Irish rebellion. In 1801 the seamen of a British fleet at anchor in the bay mutinied. Eleven of the ring-leaders were executed. Bantry Bay has, since about 1880, been a favourite anchorage for the fleet during its summer cruises, and has been the scene of many important operations and experiments.

Bantu (*i.e. Aba-ntu*, men, people), a Zulu-Kafir term, now used to designate all African races of Bantu speech. With the exception of the Hottentot-Bushman domain, they occupy all the southern half of the continent from about lat. 4° or 5° N. southwards to Kaffirland, and from the Atlantic to the Indian Ocean. The Bantu peoples are in general Negroid, rather than true Negroes, the constituent elements being mainly the Negro and the Hamite, whose various interminglings present every shade of transition between these two extremes. Hence there is no clearly marked Bantu physical type, and this term has consequently rather a linguistic than an ethnological value. Bantu is, therefore, strictly analogous in meaning to such names as Aryan and Malayo-Polynesian, which similarly imply linguistic unity in the midst of great physical diversity. All the innumerable dialects current throughout the whole of the vast Bantu domain appear to be more or less closely related both in structure, phonetics, and vocabulary, and are all certainly sprung from a common Bantu mother tongue, differing fundamentally from all other known forms of speech. It is distinguished by some remarkable grammatical features, of which the most characteristic is a certain alliterative harmony, somewhat analogous to the vocalic harmony of the Finno-Tatar system. The alliteration is caused by the repetition, in a slightly modified form, of the same prefixed element before all words of the sentence in grammatical concord. Hence the inflection in Bantu is mainly initial, not final, as in most other systems. All nouns are classed according to their proper pronominal prefix, of which there appear to have been at least sixteen in the organic Bantu language; it follows that all adjectives and other words of the sentence in agreement with, or dependent on, the noun are liable to sixteen initial changes, according to the several classes of nouns with which they may occur. Thus the adjective *kulu*, great, becomes *om-kulu*, with *ntu* or any other noun whose class prefix is *umu:* umu-ntu om-kulu, a great man; in the same way it becomes en-kulu with *kose*, a chief, whose class prefix is *in:* in-kose en-kulu, a great chief, and so on. The principle is somewhat like the final concordance for gender in the Aryan languages, as in the Latin domin-us me-us bon-us; domin-a me-a bon-a, etc. The most marked, or at least the best known members of the Bantu linguistic family are the Ki-Swahili of the east coast, largely affected by Arabic influences; the Zulu-Xosa (Zulu-Kafir) of the south-east coastlands, one of the purest and best preserved of all Bantu tongues; the Se-chuana of which the Se-Suto is a mere variety, current throughout Basuto and Bechuanaland; the Ova-Herero of Damara and Ova-Mpo Lands; the Banda and Congo of Portuguese West Africa; the Mpongwe and Bakalai of the Gaboon and Ogoway basins; Ki-Ganda and Ki-Nyoro of the Lakes Victoria and Albert Nyanza; Ki-Rua, Ki-Lunda, and Ki-Lobo of the Congo basin; Chinyanja,

of Lake Nyassa. The Bantu races are on the whole more intelligent, more civilised, and more capable of upward development than the Negro peoples proper.

Banville, THÉODORE DE, the son of a French sea captain, was born at Moulins in 1823. Coming to Paris as a youth he adopted literature as a career, and in 1842 published an eccentric poem, *Les Cariatides*, which speedily attracted notice. In 1846 appeared *Les Stalactites*, to be followed later by *Les Exilés*, *Les Odelettes*, *La Lanterne Magique*, *Mes Souvenirs*, *Paris Vécu*, *Odes Funambulesques*, etc. It might be said that the title of the last-named volume most aptly describes De Banville's genius. His muse walks blindfold and in fetters along a thin cord of sense or plot stretched across an abyss of nothingness. His art lies chiefly in the dexterous management of startling rhymes and unfamiliar metres. The form with him is all important, the matter of little consequence; though here and there one comes across passages of real poetic feeling, crisp touches of cynicism provoked by modern French manners, or flashes of quaint wit. He tried with small success to write for the stage, and brought out some prose sketches, as well as a treatise on poetic methods. He died in 1891.

Banyai, one of the aboriginal races of Matabililand, South Central Africa, now largely reduced, absorbed or driven north to the Zambesi by the Ama-Ntabele (Matabili) intruders from Zululand. They are now chiefly confined to the right bank of the Zambesi above the Kafukwa confluence. The *Banyai* are physically a very fine race, tall, well-proportioned, and of remarkably light brown complexion; speech, a Bantu dialect akin to the Chinyanja of Nyassaland.

Banyan (*Ficus indica*), a species of fig, which in India not only reaches the size of a large tree, but is specially noticeable from its sending down

BANYAN (*Ficus indica*).

numerous adventitious roots from its branches which thicken and acquire a covering of cork, so as to resemble a grove of stems, and, by acting as props, enable the branches to spread in a horizontal direction to a great distance.

Banyans (BANIANS), a numerous Gujarâti people, West India, of the Vaicya or trading caste; are the chief merchant element in Gujarât and Bombay; type, Hindu mixed with Jât (pre-Aryan) elements. The term Banyan is now generally applied to all the Indian traders long settled in the seaports of East Africa, South Arabia, etc., though they have no necessary connection with the Banian tribe. The Banyans are extremely intelligent, thrifty, and moral, according to their religious standard. Besides their mother tongue, Gujarâti, many speak both Hindustâni and English.

Banyuls-sur-mer and **Banyuls-des-Aspres,** two towns in the department of Pyrénées Orientales, France. The first contains four ancient towers, one of which marks the French and Spanish frontier. The second, now a mere village, offered a gallant resistance in 1793 to 7,000 Spaniards, who were compelled to surrender.

Banyumas, a province and its capital belonging to the Dutch in the island of Java. The province has an area of 2,136 square miles, with a dense population. The mountainous portion contains a remarkable volcanic plateau, 6,700 feet above sea-level, and a gorge which from the poisonous vapours it exhales is called "the valley of death." The fertile plains produce coffee, indigo, rice, tobacco, etc. The town stands on the left bank of the river Serajo at a distance of 22 miles from the coast, near the opening of a rich valley. It is protected by a fort and a Dutch garrison.

Banyuwangi, or BANJOEWANGIE, a port and a district on the E. coast of Java, subject to Dutch rule, and a station of the telegraph line to Australia.

Banz, a town in Upper Franconia, Bavaria, Germany, on the river Main, and half-way between Coburg and Bamberg.

Baobab (*Adansonia digitata*), the monkey-bread or Ethiopian sour-gourd, is a remarkable tree. It is a member of the order *Bombaceæ*, the silk-cotton family, and is a native of tropical Africa. It reaches a height of from 40 to 70 feet, but may have a diameter of 30 feet, being often narrower both above and below than it is in the middle of the stem. The wood is soft, and is hollowed out by negroes as a place of interment; but the fibre of the bark is a valuable paper-making material. The digitately-lobed leaves are used as a blood-purifier, and the pulp, which surrounds the seeds in the large capsular fruit, as a specific in fever.

Bapedi, a large Bantu nation, akin to the Zulus, East Transvaal, Lydenburg district, west of Delagoa Bay. Till recently the Bapedi were very powerful, and under their chief Secocuni inflicted a series of reverses on the Boers during the frontier wars which preceded the temporary annexation of the Transvaal by the English in 1874. Their power is now broken, chiefly by the rush of English-speaking miners to the rich gold fields recently discovered in the Lydenburg district.

Baphomet (probably a corruption of Mahomet), an idol alleged to be worshipped by the TEMPLARS,

Baptism (Greek, *baptismos*, from *bapto*, to dip or dye), one of the SACRAMENTS of the Christian Church. The rite was probably derived from the ceremonial washings, symbolic of cleansing from sin, of proselytes to Judaism. It was practised by John the Baptist and the disciples of Christ, but formally instituted by Him just before His ascension (Matt. xxviii. 19). Originally adult baptism was the rule, though very probably in the earliest ages of Christianity whole households were baptised together; infant baptism became customary during the fifth and sixth centuries, and Mark x. 14 and John iii. 5 are quoted in its support. Immersion was the earliest mode, and is recognised by the Church of England, but in the Western Church *affusion* or the pouring on of water became the practice in the thirteenth century, and *aspersion* or sprinkling is also recognised. Some Protestant sects, however, regard baptism by immersion and adult baptism as the only modes warranted by Scripture [BAPTISTS]. Naming is a common incident of Christian baptism, as of the Jewish rite of circumcision, but not an essential part of it. It is a much disputed point among theologians whether baptism actually produces regeneration or cleansing from original sin, or is only a symbol of the spiritual change involved in conversion to Christianity. No doubt the former belief (which is that of the Eastern and Western Churches) had much to do with the change from adult to infant baptism. Most Protestant sects, however, reject it. The Church of England implies it in her rubrics, but in the Gorham case, in 1850, the Privy Council decided that the doctrine of Baptismal Regeneration was no part of the doctrine of the Church of England as by law established. Baptism by laymen, in cases where the services of an ordained minister are not obtainable, is generally recognised in the Church of England and the Church of Rome; the latter allows even women to administer the rite in urgent cases, and recognises baptism "by desire" and "by blood" (*i.e.* martyrdom).

Baptistery (Greek *baptisterion*, a large jar or dye-vat), a building in which baptism is performed; in modern times, usually that part of a church in which the font is placed; but in the early Christian Church it was frequently a separate building (at first hexagonal or octagonal, afterwards circular), often 100 feet or more in diameter, containing a large basin or reservoir, in which a number of converts were baptised together by immersion, usually at Christmas, Easter, or Whitsuntide, before the bishop. The oldest known, that of Aquileia, is in ruins; those of Ravenna, of Florence, and of the Lateran at Rome were built between the fourth and sixth centuries. The octagonal baptistery of Florence and the circular one of Pisa are especially celebrated. A baptistery for the immersion of adult candidates for baptism was built at Cranbrook, Kent, by a vicar of the parish early in the eighteenth century, but it is only known to have been used twice.

Baptists. This religious community derives its distinctive name from the views it holds upon the rite of baptism. It maintains that the only proper *mode* is by immersion, and the only proper *subjects* are individuals who profess personal faith in Christ. In support of these views Baptists appeal to the Scriptures, affirming that neither in example nor in precept is sanction to be found for any other observance of the rite, and they declare that the spiritual significance which the New Testament attaches to baptism cannot be expressed by sprinkling or by pouring. They seek to strengthen their position by citing the opinion of eminent scholars as to the meaning and use of the Greek word *baptizo*, by referring to the absence of any mention of infant sprinkling in the writings of the Fathers of the first and second centuries, and by the discovery of the origin of baptism as applied to infants in the North African Church, the introduction of the practice being due, as they allege, to the corrupting influences of a growing sacerdotalism. They quote Tertullian, who died about 220 A.D., as being opposed to even child baptism, and Origen, who died in 254, as approving of it, and infer that as the dispute was evidently in relation to older children and not to infants, it could not have arisen had the practice of infant baptism been in existence. They trace the beginning of a change of mode to the innovation of clinic baptism—the baptism of sick persons unable to leave their beds.

As Baptists date their origin to the age of the New Testament their history embraces the entire Christian era; when, however, departure, through sacerdotal and state influences, from primitive customs became more general and decided, and especially when by the edict of Justinian in the sixth century infant baptism was enforced by law, those who adhered to the original administration of the rite became more and more a distinct sect. During the obscure Middle Ages their progress cannot be followed with any degree of certainty, but they zealously maintained, as did other spiritually minded Christians who differed from them on the question of baptism, a fearless protest against the doctrines and practices of the Catholic Church. When the Reformation in Europe arose, Baptists were full of hope at the prospect of the greater liberty to be enjoyed; these expectations, however, were not fulfilled, for they found in the Reformers opponents little less bitter than the Catholics themselves. Their unflinching testimony in favour of the simplicity of the primitive religion, and their determined refusal to acknowledge any human authority in matters of faith, brought them into disfavour, and exposed them to persecution and death. They became a sect everywhere spoken against, and it must be admitted that none were more free in their epithets of reproach than were the Reformers. Taking advantage of the spread of the Reformation, the Baptists diligently propagated their opinions, and large numbers of the people throughout Germany, Switzerland, and the Low Countries accepted their principles. Then it was the term *Anabaptist* sprang into use, implying as it does the rebaptism of those who had been baptised in infancy.

The excesses in Munster in 1534, on account of which the reputation of Baptists has been unfairly damaged, were due to fanatical theories advanced by

certain leaders. And "to accuse," says an authority, "the Continental Baptists of the sixteenth century of the deeds of the people who for nine months held possession of Munster, is as unjust as it would be to charge the excesses of Mormonism on the whole of Christendom." In endeavouring to form an accurate estimate of this episode as indeed of the state of the Continental Baptists generally, it must never be forgotten that their historians were not their friends but their decided opponents. The English Reformation brought no liberty for Baptists, for one of the first proclamations issued by Henry VIII. commanded them to leave the shores of England or suffer the penalty of death. The oldest Baptist Church in this country in existence is supposed to be at Hill Cliff in Cheshire, a tombstone discovered some time ago bearing date 1357. The records of several churches now extant go back to the sixteenth century. Amongst the noble army of martyrs not a few were Baptists.

The division into *Particular* and *General* Baptists appears to have arisen in the sixteenth century. In 1770 the *New Connexion* of the latter was formed in consequence of the Socinianism which had become rife in some of their churches. The terms Particular and General have no reference, as is commonly supposed, to the question of communion, but are purely doctrinal; the first relating to Calvinistic, and the second to Arminian views of redemption. These two communities are now being fused into one body. The word *Pædobaptist* is usually applied to those who practise *infant* baptism, though strictly speaking, as the prefix *pædo* indicates a child, a lad, a maiden, it is not sufficiently distinctive, as Baptists baptise children provided they give evidence of faith in Christ.

In their ecclesiastical polity the Baptists are congregational as distinguished from Episcopalians, Wesleyans, and Presbyterians, each church being self-governing. There are, however, county associations and Unions which hold periodic meetings for conference and mutual edification, and of more importance than these organisations is the Baptist Union, which was founded in 1832, since which date its constitution has undergone occasional revision. It has no legislative power, its functions being deliberative and fraternal. Its operations are conducted by a council consisting of 160 members, from which are appointed sub-committees for the management of its Home Mission, Annuity, Pastors' Augmentation and Education Society's Funds. Most of the churches in this country are in the membership of this Union, but not all; several churches in England of the same faith and order, as also the Strict Baptist churches (the term strict referring to close communion and membership), the Scottish churches (which have their own union), as well as the old Scottish Baptists, are outside its constituency. The statistics compiled by the editor of the *Handbook* show in connection with the whole denomination in Great Britain and Ireland, 3,062 churches, 4,146 chapels, with 1,455,030 sittings, 422,455 members, 557,038 Sunday-school scholars, with 56,757 teachers, 5,404 local preachers, and 1,970 pastors in charge. (As at December, 1909.)

The Baptists are held in high reputation on account of the prominent part they have taken in the foreign missionary enterprise. To them belongs the honourable distinction of having formed the first society in this country for propagating the Gospel amongst the *heathen*, which was established in 1792 at Kettering. Dr. Carey was its first missionary, and Andrew Fuller its first secretary. Its principle mission fields are India, China, and Africa, its missions in Jamaica being now self-supporting. The income of the Missionary Society for the year ending March, 1910, was £93,291, but this figure does not include any amounts raised at mission stations.

In addition to the organisations already noticed may be mentioned the Baptist Board, founded in 1723, for pastors in or about the cities of London and Westminster to consult and advise on subjects of a religious nature; the Particular Baptist Fund, date 1717; the Building Fund (1824), granting loans without interest; the Total Abstinence Association; The Publication Department for disseminating Baptist Literature. The Collegiate Institutions are at Bristol, Rawdon, Regent's Park, Metropolitan Tabernacle, Manchester, Cardiff, Bangor, and Glasgow.

Amongst Baptist celebrities may be enumerated Major-Gen. Harrison, of Cromwell's army, Colonel Hutchinson, John Bunyan, Hanserd Knollys, Benjamin Keach, William Kiffin, Roger Williams, of earlier date; and Dr. Gill, Robert Robinson, Dr. Beddome, Dr. Gifford, Dr. Rippon, Robert Hall, Dr. Ryland, John Foster, of more recent times.

In the United States of America the Baptists are very numerous, their membership being over 5,000,000.

Bar, literally, a term used to designate in a court of justice the inclosure made to prevent persons engaged in the business of the court from being incommoded by a crowd. From the circumstance of counsel standing in such inclosure to plead their causes, it is supposed that these lawyers who have been called to the bar, or admitted to plead, are termed "Barristers," and that the body of barristers is collectively designated "the Bar." These terms are, however, probably more directly traceable to the arrangements of the Inns of Court. [BARRISTER, INNS OF COURT.] Prisoners are also placed for trial at the bar, hence the term "prisoner at the bar." The term is also applied to the breast-high partition which divides from the body of the respective Houses of Parliament a space near the door, beyond which none but the members and clerks are admitted. To these bars witnesses and persons ordered into custody for breach of privilege are brought, and counsel stand there when pleading before the respective houses. The Commons go to the bar of the House of Lords when the King's Speech, at the opening and close of a session, is delivered. A "trial at bar" is one which takes place before all the judges of the division of the High Court in which action is brought.

Bar, BARRY. The bar is one of the honourable ordinaries in the science of Heraldry. It should contain one-fifth part of the field, and is formed by two horizontal and parallel lines crossing the escutcheon from side to side, and it never occurs

singly. In this it differs from the *fesse*, though the latter, whilst containing a third part thereof, always occupies a fixed point in the centre of the shield, whereas a bar is not confined to one place. When the field itself is composed of a number of bars alternately of different tinctures, it is said to be *barry* of so many (usually six or eight). The diminutives of the bar are the *closet* and the *barrulet*, and this last gives its name to the term *barruletty*, which, though sometimes confounded with "barry," should explain itself.

Baraba, or BARABINSKA, the name of a steppe in Asiatic Russia, lying W. of Omsk, between the Obi and Irtisk rivers, and having a length of 400 miles and a breadth of 300. The area is broken by a few salt lakes and birch forests, but is otherwise an expanse of black loam. It was occupied in 1767 by Russian colonists.

Barabra. [NUBIANS.]

Barabras, a district in Upper Egypt just S. of the first cataract on the Nile between the twenty-third and twenty-fourth parallels. It is also known as the Kenoos country.

Baraguay D'Hilliers, ACHILLE, born in Paris in 1795, fought in the Russian campaign and at Leipsic, where, at the age of 18, he lost his left hand. He took part in Quatre-Bras and other battles of the Hundred Days. Later on he distinguished himself in Algeria in the service of Louis Philippe, and giving his adhesion to the Republic, he was sent by Louis Napoleon, in 1849, on a mission to Rome, and later as ambassador to the Porte. At the outbreak of the war with Russia he took command of the military force that co-operated with the English and French fleets in the reduction of Bomarsund. He was made life-senator and marshal, and in 1870 for a brief period commanded the besieged garrison of Paris. His last public appearance was as president of the inquiry into the conduct of Marshal Bazaine in 1872. He died in 1878.

Barak, a branch of the Khatak Afghans, with four main divisions: Uzshdah, Land, Mandan, Manzai. [KHATAK.]

Barak, THE, a river in the territory of Cachar, Farther India. Traversing the S. division of the province, it enters Sylhet, and after a tortuous course empties itself into the Brahmaputra 43 miles above Dacca. Its total length is 350 miles.

Barakzae, the royal tribe of the Bar-Durâni Afghans since 1818; they are a branch of the Popalzae Ziraks, now in the Cabul district; 35,000 families.

Barante, AMABLE GUILLAUME PROSPER BRUGIÈRE, BARON DE, was born at Riom in 1782. From 1806 to 1848 he occupied with distinction a succession of political and diplomatic posts, having served as ambassador at St. Petersburg when the Revolution broke out. He then retired into private life, continuing his literary pursuits in his country-house in Auvergne, where he died in 1866. His *History of the Dukes of Burgundy* is a monument of research and ability, and his *History of the National Convention* deserves praise. Besides these he published many literary essays, translated Schiller's plays, and contributed a version of *Hamlet* to Guizot's *Shakespeare*.

Baraset, or BARASUT, a district and town a few miles N. of Calcutta on the same side of the Hooghly. The area of the district is 1,424 sq. miles.

Baratynski, JERVGENIJ ABRAMOVITCH, born in Russia in 1800, entered the army, but after eight years' service was compelled to resign, owing to some youthful misconduct. He then settled at Moscow and gave himself up to poetry, writing his masterpiece, *The Gipsy*. His health broke down, and he sought a warmer climate at Naples, where he died in 1844.

Barb, a name sometimes given to a breed of horses, and to a variety of pigeons, both originally from Barbary. [HORSE, PIGEON.]

Barbadoes, an island in the E. portion of the Windward group of the West Indian Archipelago. It was occupied by the English in 1624–5, and since the restoration has been in the hands of the Crown, serving as the administrative centre of the group. It is rather larger than the Isle of Wight, has a rich soil and a fairly healthy climate; and is almost encircled by coral reefs. Owing to its position it is peculiarly liable to hurricanes. Bridgetown is the capital. James Town, Speight's Town, and Oistins are places of importance. The chief products are sugar, arrowroot, ginger, and aloes.

Barbara, SAINT, a Christian saint and martyr of the third century. For her adoption of the faith she was immured in a tower—which is her symbol, especially Flemish art—and then beheaded by her own father, but other legends represent her as having escaped miraculously. Her day is kept on March 7th, and some Catholics look on her as extending special protection over artillery.

Barbarian. The Gk. *barbaros*, probably formed as an imitation of an unintelligible foreign language, originally meant one who could not speak Greek. From the Persian wars onwards the Greeks came to contrast their superior civilisation with that of foreigners and to use the term with a certain contemptuous sense. After the conquests of Alexander the Great it was only uncivilised races who could not speak Greek, and the term therefore became equivalent to savage. Mr. Matthew Arnold used the word to characterise the youth of the English upper classes, fond of sport and open-air life, but hardly tinctured by literary culture.

Barbarossa (*Red-beard*), the Italian name of Horuk or Aruch, the son of a Turkish soldier, who was born at Mitylene about 1474. He and his brother became such wealthy and influential pirates that they were invited by the Algerine Musulmans to help them against the Spaniards. Horuk soon seated himself on the Algerian throne, to which he annexed those of Tunis and Tlemcen. However, the heir to the latter, assisted by Gomares, the Spanish Governor of Oran, made a vigorous resistance, and Barbarossa was killed on the bank of the river Meileh, in 1518.

Barbarossa, KAIR-UD-DEEN, brother and successor of the foregoing in the kingdom of Algiers, was employed by the Sultan Selim II. as naval commander. He captured Tunis, but in 1536 was driven out of N. Africa by the Emperor Charles V. He then harried the coasts of Italy for some years, and subjected Yemen to Ottoman rule, dying at Constantinople in 1546.

Barbarossa, THE EMPEROR. [FREDERICK I.]

Barbaroux, CHARLES, born at Marseilles in 1767, was in early life distinguished by his aptitude for physical science, and corresponded with Benjamin Franklin. Elected to the National Assembly on the outbreak of the Revolution, he opposed the violence of Marat and Robespierre, proposed the trial of Louis XVI., and fell with the Girondists. He was seized and guillotined at Bordeaux in 1794.

Barbary, a geographical term somewhat vaguely applied to North Africa, including the States of Morocco, Algeria, Tunis, Tripoli, etc. The name is probably to be traced to the Berbers (q.v.), one of the oldest races inhabiting the region, and the resemblance to the Latin *barbarus* may not be a mere accident. The horses for which the country is famous are known as *barbs*.

Barbary Ape (*Macacus inuus*), a tailless Macaque (q.v.), sometimes made the type of a genus, with the name *Inuus ecaudatus*, interesting as being the only species of monkey now living in Europe, though only at Gibraltar. It is about 30 inches long, standing somewhat less at the shoulder; the upper surface is yellowish brown, deepening on the head and round the cheeks, the under parts are whitish, and the face, ears, and other hairless parts flesh coloured. The Barbary Apes, or Magots, as they are sometimes called, are found in the mountainous parts of North Africa, where they assemble in troops, like baboons, and descend to plunder plantations and gardens. When young, these animals are very playful and gentle, and can be taught a number of tricks, but as they grow old they become morose and vicious. There is a colony of Barbary Apes on the Rock of Gibraltar, probably the descendants of some who wandered northwards before Europe and Africa were separated by the straits. They feed on roots and bulbs, which they dig up from the broken ground, for there are no fruit trees to plunder. It is said that the garrison was saved by these apes from surprise by the Spaniards during the celebrated siege. The attacking party had to pass a place where a number of these animals were collected, and startled them. Their cries roused the British soldiers, who were soon ready to repel the intended attack. In return for this service General Elliott, the commander, never allowed these monkeys to be molested. The Barbary Ape is also noteworthy as being the subject of the dissections of Galen, from which he learnt all that served for anatomy till Vesalius, in the 16th century, placed that science on a firm basis.

Barbary Deer (*Cervus barbarus*), chiefly distinguished from its Algerian variety and from the Red Deer by its smaller size, stouter form, and more permanently spotted fur. It is noteworthy as being the only true deer found in Africa, which abounds in antelopes. [ANTELOPE, DEER.]

Barbary Mouse (*Mus barbarus*), sometimes called the Striped Mouse, from Northern Africa, remarkable for its coloration. It is rather larger than the common mouse, darkish brown above, with five or six yellowish longitudinal stripes on each side, fading by degrees into the white of the under surface.

Barbary Sheep. [AOUDAD.]

Barbastelle (*Synotus barbastellus*), an English bat, distinguished chiefly by the outer margin of the ear being carried forwards above the mouth and in front of the eye.

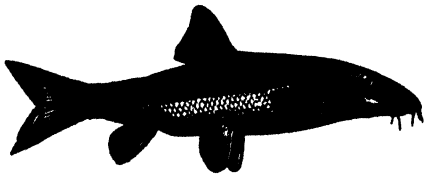
Barbauld, ANNA LÆTITIA, the daughter of the Rev. John Aikin, was born at Kibworth-Harcourt, Leicestershire in 1743, and in 1774 married the Rev. Rochemont Barbauld, a Unitarian minister, having in the previous year published a volume of poems. With her husband she opened a school at Palgrave in Suffolk, and among their pupils were Lord Denman, Taylor of Norwich, Sir W. Gell, and others destined to future distinction. Here she wrote her *Hymns in Prose for Children*. In 1785 they moved to Hampstead, and Mrs. Barbauld assisted her brother in bringing out *Evenings at Home*. In 1802 the Barbaulds established themselves at Stoke Newington, where she composed her *Selections from the Essayists, Life of Richardson*, and her *Collection of British Novelists*, together with her last and longest poem, *Eighteen Hundred and Eleven*. Her husband died in 1808, but she survived until 1825, surrounded by many friends and intellectual admirers. Her works were edited, and her memoirs gracefully written by her niece, Lucy Aikin.

Barbecue (Haitian *barbacola*, a frame to support meat while it is being smoked), an ox or hog roasted whole; hence, an open-air feast at which this is done, formerly common in the south-western United States.

Barbed, a term in *Heraldry*, which, besides being applied to a particular and peculiarly-shaped cross, and occasionally in conjunction with the word crested (*barbed and crested*) to signify that the comb and wattles of a cock are of a different tincture from its body, is most generally used to describe the head of an arrow (in a like case), or to denote the green leaves upon the outside of the full-blown heraldic rose, which is usually blazoned, *a rose gules, barbed and seeded, ppr.*

Barbel, any fish of the genus Barbus, of the family Cyprinidæ. The dorsal fin, which is opposite the root of the ventral fin, and rarely includes more than nine branched rays, generally has the third ray enlarged and ossified; the anal fin is short and high; four barbules (whence the popular name) or fleshy tentacles grow from the lips—two at the nose, and one at each angle of the mouth. This genus contains nearly 200 species, and may be divided into three sections:—(1) Those with four barbules as in the Common Barbel (*B. vulgaris*); (2) those in which the barbules are reduced to two;

and (3) those in which the barbules are absent, as in some East Indian forms. The greater number of species live in the fresh waters of India and the East Indian Archipelago, but the genus is widely represented in Asia and Africa, and moderately so in Europe, though the species decrease westward to two in France and one in Britain. The Common



BARBEL (*Barbus vulgaris*).

Barbel is usually about fifteen inches long, though specimens of more than three feet are on record; olive-green above, becoming lighter on the flanks and greenish white towards the belly, which, with the throat, is pearly white. The sides of the head are marked with black, and the marking is sometimes continued along the body. They feed almost entirely on aquatic plants and roots, boring with their snout into the banks of ponds and rivers to obtain them. The Barbel is plentiful in the upper reaches of the Thames, and is more valued by the angler for sport than as a food fish; but if boiled in salt and water and eaten cold with a squeeze of lemon juice the flesh will be found palatable. The roe is said to be poisonous and is removed before the fish is cooked. In cold weather these fish undergo a partial hibernation, and then are taken with a scoop-net. Other noteworthy species are *B. bynni*, from the Nile, *B. canis* from the Jordan, the large Barbels from the Tigris, and *B. mosal* from Indian mountain streams, probably the largest species known, the scales of which are as large as the palm of the human hand.

Barber (Low Latin *barbarius*, from *barba*, a beard). The calling of a barber is of considerable antiquity (*see* Ezek. v. 1). The nature of the profession obviously makes the barber a purveyor of news and gossip; and the characters of the barber in the *Arabian Nights* and in Rossini's *Barber of Seville* are well known. In mediæval times the barber also performed such minor surgical operations as tooth-drawing and blood-letting. The Company of Barber-Surgeons was incorporated under Edward I., but the two professions were separated in England by an Act of Parliament in 1545. The long striped pole now often seen outside the barber's door is said to typify an arm bound round with ribbon previous to bleeding.

Barberini, the name of a famous Florentine family, a member of which, as Urban VIII., was elected pope in 1623. His three nephews appropriated everything that they could seize in Rome, and Antonio Cardinal Barberini, at the head of Papal troops, wrought much mischief in Parma, Modena, and Tuscany. On the accession of Innocent X. the Cardinal retired to France, was made Grand Almoner and Archbishop of Rheims, and died in 1671, aged 63. Meanwhile the family were restored to their great possessions in Italy, which they still hold.

Barberry, or BERBERRY (*Berberis vulgaris*), a British shrub, belonging to the order *Berberidaceæ*, containing many varieties. It grows generally 8 or 10 feet high, with a yellow astringent bark and roots, used in dyeing. The leaves are small, obovate, ciliate, bright-green, and deciduous, being clustered by the shortening of the spinous branches. The pendulous racemes of yellow flowers have irritable stamens, dehiscing by valves, and the berry-like fruit is oblong and generally orange. It is used in pickles and preserves. The leaves are attacked by a fungus, the cluster-cup, *Æcidium Berberidis*, now known to be only one stage of *Puccinia graminis*, the wheat-mildew [ÆCIDIUM], for which reason the barberry is rooted up by farmers.

Barberton, a mining town of the Transvaal, South Africa, situated in the De Kaap gold-fields 292 miles N. of Durban. It sprang up in 1886 owing to the influx of miners and speculators attracted by a promising reef, and took its name from one of the earliest prospectors. It is now a local centre of some importance.

Barbet, any bird of the family Megalæmidæ (containing 13 genera with 81 species) widely distributed in the tropics, but characteristic of the equatorial forest-zone, the most remarkable forms being confined to equatorial America, West Africa, and the Indo-Malay islands. They are rather small birds, of heavy ungraceful form and gaudy plumage, strictly arboreal in their habits and feeding on fruit, seeds, and buds, and occasionally on insects. The name was formerly applied to the Bucconidæ or Puff-birds (q.v.).

Barbette, a platform inside the parapet of a rampart, on which heavy guns are mounted so that they can be fired over the rampart instead of through embrasures. A barbette ship is a war vessel carrying heavy guns, which are fired from a platform, or over the bulwarks, and not through portholes.

Barbican (Old French *barbicane*, probably an Arabic or Persian word), an outwork defending the drawbridge of a fortification, or a tower over the gate of a castle or fortress. The most perfect specimen of the former type exists at Carcassonne, in France.

Barbier, ANTOINE ALEXANDRE, born at Coulommiers in 1765, entered the priesthood, but at the outbreak of the Revolution threw aside his vows and married. He was employed by the Convention to collect the books and works of art of the suppressed convents. He became Napoleon's librarian in 1807, and founded the libraries at the Louvre, Compiègne, and Fontainebleau. He died in 1825, leaving a son to succeed him at the Louvre.

Barbier, HENRI AUGUSTE, born in Paris in 1805, and educated for the bar, was inspired by the ferment of July, 1830, to write in the papers

vigorous political verses. His *Iambes*, a more sustained effort, followed. *Lazare* and *Le Minotaure* were suggested by the social state of London. He tried his hand at translating Shakespeare's *Julius Cæsar*, was elected to the Academy in 1869, dying in 1882. Of his works only the *Iambes* will survive.

Barbou, JOSEPH GÉRARD, the most distinguished member of a family of French booksellers and printers, who, beginning business at Lyons, were established in Paris about the middle of the eighteenth century. From 1755 to 1775 he brought out his famous collection of classics, in which the chief scholars of France co-operated.

Barbour, JOHN, born in Scotland about 1316, and said to have been educated at Oxford, entered the Church, and became chaplain to King David Bruce, also serving for forty years as Archdeacon of Aberdeen. He wrote in verse *The Life and Actions of King Robert Bruce*, a work consisting of 13,000 octosyllabic lines, and possessing both historical and literary merit. He also described in a poem, entitled *The Brute*, the career of that mythical descendant of Æneas who was supposed to have settled in England. Even an age that produced Chaucer need not be ashamed of Barbour. He died in 1395.

Barbuda, one of the leeward group of the West Indian Archipelago, 10 miles long and 8 miles wide. Though rather low-lying and level it has a wholesome climate. For purposes of administration the island is subordinate to Antigua, 20 miles distant.

Barca, a Turkish province on the N. coast of Africa, between Tripoli and Egypt, having a length of 500 miles from N. to S. by a breadth of 400 miles. In classical times it was known as Cyrenaica, or Libya Pentapolis, the seat of the five Greek colonies of Arsinoë, Barca, Cyrene, Apollonia, and Berenice, the last of which is the modern capital Bengazi. Since the sixteenth century it had been under the beys of Tripoli, from whom it was taken by treaty in 1869, and made dependent on the Porte. Though no rivers exist and drought is a serious drawback, the soil produces millet, maize, figs, dates, and olives.

Barcarolle (Italian *barcarolo*, boatman, from *barca*, a boat), a song sung by Venetian gondoliers, or a piece of instrumental music composed in imitation of it.

Barcelona, the name (said to be derived from Hamilcar Barca) of a province and its capital on the E. coast of Spain. The province first came into existence as a country under Charlemagne in 801, and was, after several vicissitudes, merged in the kingdom of Aragon. The city now ranks as the second in Spain, and stands at the mouth of the river Llobregat on the edge of a small fertile plain sloping towards the Mediterranean. The streets of the ancient quarter, dating from very remote times, are narrow, crooked, and full of flat-roofed, semi-Oriental houses. The Plaza Nuova is a fine open space, and the new faubourgs are Parisian in style. In 1845 the citadel and ramparts were removed, and public gardens put in their places, but the fortress Montjuich to the S.W. recalls Peterborough's exploit in 1705. On the other side of the harbour is the suburb of Barceloneta. The port, in spite of the obstruction of a bar, does a large trade, exporting nuts and fruits, leather, silk,

PLAZA NUOVA, BARCELONA.

wine, brandy, iron, copper, cork, etc. The cathedral, begun in the thirteenth century and never completed, is a fine example of the Pointed style, and contains magnificent glass. The university was founded in 1430. The royal palace was destroyed by fire in 1875. There are numbers of handsome churches and convents, two valuable libraries, municipal buildings, and many theatres. It is connected by rail with Paris and Madrid, and has given shelter to many English criminals as being the most accessible spot beyond extradition laws.

Barcelona, NEW, a province and its capital in the department of Cumana, Venezuela, South America. The province has an area of 13,744 square miles. The town stands on the left bank of the river Neveri, about 2 miles from the coast. It is a filthy and unhealthy place, chiefly engaged in the horse and cattle trades.

Barclay, ALEXANDER, born in Scotland (?) about 1476, seems to have spent his youth in travelling, and on his return entered the Benedictine monastery at Ely, afterwards joining the Franciscans at Canterbury. On the dissolution of the religious houses he held a living in Somersetshire and later in Essex. He translated into English the *Navis Stultifera*, or *Ship of Fools*, making many original additions. His work was published by Pynson in 1509. He also wrote some Eclogues, in which he took Virgil and Petrarch for his models. He died in 1552.

Barclay, JOHN, born in 1582, at Pont-à-Mousson, France, where his father, a Scotsman, patronised by Mary, Queen of Scots, held a professorship. He came over to England for ten years, and his poem *Satyricon* and his romance *Argenis* attracted some notice. Grotius praised his Latinity. He died prematurely at Rome in 1621.

Barclay, ROBERT, born at Gordonstown, Morayshire, Scotland, in 1648, was educated at Paris by his uncle, the principal of the Scots College. Fearing papistical tendencies his father recalled him, and he became a devoted member of the Society of Friends, not merely writing in defence of their views, but preaching their doctrines at home and abroad, and suffering some persecution. His best known work is *An Apology for the True Christian Divinity*, which appeared in 1676. He died in 1690 at Ury, in Kincardineshire.

Barclay de Tolly, MICHAEL, born in Livonia of Scottish family, in 1759, entered the Russian army, and in the campaigns of 1806–7 rose to be field-marshal. He held the chief command of the Russians at the battle of Leipsic, and at the entrance of the Allies into France in 1815. He was subsequently minister of war at St. Petersburg, and received the title of Prince. He died in 1818.

Barcochebas, or BARCOCHAB (Heb. *son of a star*), a Jewish leader, who persuaded his countrymen to rebel against Rome in the time of Hadrian. He declared himself to be the "star" referred to in Numb. xxiv. 17, and adopted the name by which he is known in place of his patronymic Simeon. His followers made him king of Jerusalem, and for a time he gave the Romans trouble, till in 135 A.D. he was defeated and killed by Julius Severus.

Bard, a village in Piedmont, Italy, 23 miles S.E. of Aosta, commanding by means of its fortress the pass into that valley from France. Napoleon, checked here in 1800 by a small Austrian garrison, destroyed the fort, but it has since been rebuilt.

Bard (an Irish and Gaelic word for a poet; Lat. *bardus*), the poets and singers of the ancient Keltic races, who celebrated the deeds of gods, heroes, and warriors, accompanying their recitations with the harp. In both Wales and Ireland they formed hereditary guilds, and in the latter country kept up the national feeling against the conqueror. In the former they held periodical competitions in poetry and music, which were revived in the 18th century and are now well known. [EISTEDDFOD.]

Bardesanes, or BAR DEISAN, a Syrian neresiarch of the second century, who, having long been orthodox, first joined the Valentinians, and then invented his own particular form of error, which was akin to the Manichean doctrine. His hymns were famous, and a fine specimen of his style is preserved by Eusebius.

Bar-Durani, the collective name of the Afghan tribes between the Hindu-Kûsh, Indus, Salt, and Soliman Mountains, first applied to them by Ahmed Shah, founder of the modern kingdom of Afghanistan (1746). In the group are comprised the Yusafzaes, Utman Khels, Turkolâni, Mohmands, Afridis, Orakzaes, Shinwaris, Bangash, Khataks, Ziraks, Panjpaos, and many others.

Barebones Parliament. After Oliver Cromwell had forcibly suppressed the Rump Parliament (April 20th, 1653), an assembly was selected by his council of officers from lists furnished by the various churches to act as a legislature. England was represented by 132 members, Wales and Ireland by six each, and Scotland by five. Though generally spoken of as an assembly of fanatics, it included Blake, Montague, Monk, Ashley Cooper, and other influential persons. It met July 4th, 1653, and passed laws relaxing imprisonment for debt, permitting civil marriage, and abolishing tithes and the patronage of benefices. As the two latter measures would practically have disestablished the Church, a motion was brought forward unexpectedly and carried in the absence of most of the advanced party, that the members should resign their power to Cromwell. The dissentients were then expelled by soldiers. The name is derived from a prominent member, Praise-God Barbon, or Barebones, a leather-seller, of Fleet Street. The body is also sometimes called the "Assembly of Nominees" or the "Little Parliament."

Barège, a slight, sometimes almost transparent, fabric of silk and worsted or cotton and worsted, for ladies' dresses, first manufactured at Luz in the valley of Barèges in the Pyrenees.

Barèges, a small town in the department of Hautes Pyrénées, France, standing on the Gave de Bastan, about 33 miles from Tarbes. Its sulphurous springs are highly esteemed for gunshot wounds, and a military hospital is established here. The light woollen tissues named from the place are made chiefly at Bagnères-de-Bigorre (q.v.).

Bareilly, or BARELI, a district and its chief town in the division of Rohilkhand, North-West Provinces of British India. The former occupies an area of 1,614 square miles between the Ganges on the W. and Oudh on the E. and S., the Kumaon hills, Farakabad, Aligahr, and Moradabad to the N. and W. It is level, and on the whole fertile, being watered by the Gogra and Ramanga, but there is a belt of jungle to the N. Rice and sugar are the chief products. The city stands on the left bank of the Jua, and is large and handsome, being the most populous in the division. It contains a famous college, and was one of the first places at which the mutiny of 1857 declared itself. The Rohillas sustained severe defeats in its neighbourhood by Colonel Champion in 1774, and Sir Robert Abercrombie in 1796.

Barents, or BARENTS, WILLIAM, was born in the island of Ter Schelling, off the coast of Friesland, but little or nothing is known of him until in 1594 he set out as pilot of a Dutch expedition which explored much of the coast of Nova Zembla, and the next year he made a less successful voyage to the same region. In 1596 with two ships he pushed as far north as Spitzbergen, then came down to Nova Zembla, and wintered in a spot which he

alled Ice Haven, being the first explorer who ever ncurred such an experience. Next summer, after reat privations, the party got home again, but Barentz died on the journey. His memorials have een published by the Hakluyt Society.

Barère de Vieuzac, BERTRAND, born at Tarbes in 1755, practised at the bar in Toulouse, nd was sent as a representative of the Tiers Etat o the States General and the Convention. The art he played in the National Assembly was at first nild enough, but in the Convention he joined the nore violent section, voted for the execution of the cing, supported Robespierre, Couthon, and St. Just n the Reign of Terror, and was a member of *Le Comité du Salut Public*. He somewhat severed himself from his associates before the reaction set n, but would have shared their fate had he not contrived to escape. Napoleon allowed him to return, and used him as a spy. At the Restoration he had once more to fly, but after 1830 returned from Belgium, received a small pension, and died at Paris n 1841. His fondness for dabbling in light literature and his cheerful *insouciance* where his own neck was not in danger, won him the title of "the Anacreon of the Guillotine," and Macaulay describes him as approaching more nearly than anyone "to he idea of consummate and universal depravity."

Baretti, GIUSEPPE, born at Turin in 1719. After making some reputation by translating Corneille into Italian and by other efforts in prose nd verse, he established himself as a teacher in London in 1751. He became secretary to the Royal Academy, and by Dr. Johnson's introduction aught Italian to Mrs. Thrale. He was tried at the Old Bailey in 1769 for killing a man who attacked him in the Haymarket and was acquitted. His dictionaries of Italian and Spanish are still extant. Lord North gave him a pension; he died in 1789.

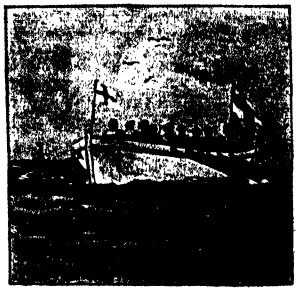
Bargain and Sale, an ancient form of conveyance of land. A "Bargain and Sale" required to be enrolled within six months. It has long ceased to be in use for freehold interests in England, but curiously enough it is the common form of conveyance in the United States, where it has its virtue and validity mainly by force of the Statute of Uses (q.v.). In Scotland no such transaction as a Bargain and Sale exists with reference to real estate.

Bargander, BERGANDER, local names for the Sheldrake (q.v.), from its habit of breeding in rabbit burrows and other holes in soft soil, whence it is also called the Burrow Duck.

Barge, a boat of state, particularly the state boat of an admiral or a captain of a man-of-war. It is usually long, narrow, light, and clinker-built. The name barge is also applied to a flat-bottomed vessel of burden intended for use on inland waters, or for loading and unloading larger craft.

Barge Board, a board extending along the inside edge of the gable of a house, to protect the rafters from the weather, often richly carved and ornamented.

Bargousin, THE, a river in the government of Irkutsk, Siberia, Asiatic Russia, where, after a course of 200 miles, it discharges itself into Lake Baikal. On it is situated the town of Bargouzinsk, the capital of the administrative circle, with thermal springs in its vicinity.



SHIP'S BARGE.

Barham, THE REV. RICHARD HARRIS, better known by his literary pseudonym "Thomas Ingoldsby," was born at Canterbury in 1788, and after an Oxford education was about to enter the law when his tastes drew him towards the Church, and he was ordained in 1813. He obtained a minor canonry at St. Paul's, was made a priest in ordinary of the Chapel Royal, and ultimately received the living of St. Augustine's. He soon became mixed up in literary society, for which his wit and kindly nature fitted him so completely. His incomparable *Ingoldsby Legends* appeared in *Bentley's Miscellany*, and being reprinted passed through many editions. He wrote also for *Blackwood* and the *Literary Gazette*, contributed about a third of the matter to *Gorton's Biographical Dictionary*, and produced a successful novel, *My Cousin Nicholas*. He died in Amen Corner in 1845.

Bari, a numerous negro nation along both banks of the White Nile, above and below Lado, between lat. 6° and 4° N. The Bari territory covers an area of over 6,000 square miles, with a population of about 150,000; it is conterminous on the west with that of the Makarakas, a western branch of the Zandehs (Niam-Niam), who greatly excel the Bari in intelligence, enterprise, and industry. The Bari have been described by Schweinfurth (*Heart of Africa*), and by Dr. W. Junker (*Travels in Africa*, 1890).

Bari, TERRA DI, a province in the S. of Italy, with an area of 3,782 square miles, lying on the Adriatic coast between Capitanata, Potenza, and Otranto. Level to the N. and mountainous to the S., it is fairly fertile in grain, fruit, and wine, besides feeding sheep, goats, asses, and swine.

Bari (classic *Barium*), the chief town of the province, stands on a peninsula in the Adriatic about 135 miles N.E. of Naples, and possesses a tolerable harbour, being defended by old walls. The citadel dates from the 11th century, and there is a cathedral, the seat of an archbishopric, besides the old Norman church of S. Nicolas and other fine public buildings. Railways connect the place with Brindisi and Taranto. Within recent years the trade has greatly improved.

Barilla, a crude form of sodium carbonate, or soda, obtained by digesting the ashes of certain

marine plants with water, and evaporating the solution so obtained. It was formerly made extensively, being used in manufacture of soap, but is now prepared only to a small extent owing to advances in the processes for manufacturing soda.

Baring, Sir Francis, Bart., was born in 1740, being the third son of John Baring, M.P. for Exeter, whose family came from Bremen. He founded the great house of Barings and Co., which rivalled the Rothschilds, was for many years a director of the East India Company, and held a large interest in government loans, whence he derived great profits, especially in the critical years 1797 and 1806. He sat in Parliament from 1784 to 1806, was made a baronet in 1793, and died in 1810, leaving the then enormous fortune of two millions in realised and landed property. From him descend Lord Ashburton, Lord Northbrook, and Lord Revelstoke.

Barita, a lapsed Cuvierian genus of birds. [Piping Crow.]

Baritone (Greek *barys*, heavy; *tonos*, tone), in *Music* a male voice, in quality between tenor and bass. Also the name of a small kind of sax-horn, now almost obsolete. In the baritone clef the F is written upon the third line.

Barium, a metal which is only found in nature in a combined state, most commonly as *sulphate* in *Barytes*, or *heavy spar*, and as *carbonate* in *Witherite*. Its compounds are characterised by high density, whence its name (Gk. *barys*, heavy). The metal itself is very difficult to prepare, and was first isolated by Sir H. Davy in 1808, though he probably only obtained an amalgam. It has a specific gravity 4·0, atomic weight 137, burns in air if heated, and decomposes water rapidly. It forms an *oxide*, BaO, closely resembling lime and known as *Baryta*. It also forms an oxide, BaO_2, which has been the starting point of many attempts for the manufacture of oxygen gas. *Baryta* is used in sugar refining; and certain salts, as the *nitrate* and *chloride*, are largely used in pyrotechny—for *green* fires—and in chemical analysis.

Bark, a term somewhat loosely applied to the outer part of an exogenous stem. By woodcraftsmen it is commonly employed for everything external to the *cambium* or growing-layer, which is the layer torn through in "barking" a tree, and they divide it into the two layers, the fibrous inner bark, or bast, and the outer bark or cork. Botanists employ the term rather to the dead tissues—whether in part composed of the epidermis, the hypoderm or other part of the primary cortex, the periderm or corky secondary cortex, or sometimes, in part, of bast—which are spontaneously thrown off by the tree, owing to the formation of cork below them by which they are cut off from all the vital juices of the plant. Medicinally the term is more especially applied to the bark of the Cinchonas, the source of quinine.

Barker, Edmund Henry, philologist, born in 1788, at Hollym, in Yorkshire. He published editions of several classical works and edited a new issue of Stephen's *Thesaurus Linguæ Græcæ*. Other works of his were *Classical Recreations*, *Reminiscences of Professor Porson*, and *Parriana*. He died in 1839.

Barker, Thomas, of Bath, was a distinguished landscape painter, who lived from 1769 to 1847. One of his best works is in the National Gallery, and others are at South Kensington.

Barker, Thomas Jones, son of the preceding, was born in 1815, and studied under Horace Vernet. He devoted himself to military subjects, and painted *The Meeting of Wellington and Blucher*, *The Allied Generals before Sebastopol*, *The Relief of Lucknow*, and *The Surrender of Napoleon III. at Sedan*. He died in 1882.

Barker's Mill, an arrangement in which the reaction produced by water flowing from a vessel causes it to rotate. A hollow cylinder is supported vertically on a pivot so as to be capable of free rotation. Two hollow arms project from its lower end, and are provided with nozzles on opposite sides. When water is poured into the vessel at the top it flows out at these orifices, which are so arranged that the outflow of the water in one direction may cause the vessel to move in the opposite direction. [Hydraulics.]

Barking, a very ancient market-town and port in Essex. It stands on the river Roding, better known as Barking Creek, which enters the Thames seven miles below London. There is a fine old church dedicated to St. Margaret, and containing some interesting monuments. An ancient gateway still exists. The nunnery at Barking established in the seventh century flourished until the dissolution of the religious houses. Pop. (1901), 21,547.

Barking Bird, the popular name of *Pteroptochos tarnii*, a Chilian wren-like bird, with a note like the yelping of a small dog.

Barking Deer. [Muntjac.]

Barlaam and Josaphat, a Greek Christian legend, dating probably from the seventh century A.D., but due in its present form to John of Damascus, a Greek who lived at the court of the Caliph of Bagdad about 1090, recounting the conversion of the Indian Prince Josaphat by the hermit Barlaam. Both these personages appear as saints in the Roman Catholic Calendar; but the story is only a Christianised version of the legendary history of Buddha. See Max Müller's *Chips from a German Workshop*, vol. iii.

Bar-le-duc, or Bar-sur-Ornain, chief town of the department of Meuse, 125 miles from Paris, with which it is connected by railway. It is on the river Ornain, and possesses an old church, a college, library, etc. Cottons, leather, hosiery, corsets, and confectioneries are made here, and a good deal of trade is carried on in timber, iron, wine, and wool.

Barletta, a port in the province of Terra di Bari, Italy. It is situated on a small island in the Gulf of Venice, 33 miles N. of Bari, and is connected with the mainland by a bridge. The streets are

broad and well paved, and the houses are of dressed stone. The Gothic cathedral is supported by curious granite columns. The little harbour does some trade in salt, fruit, almonds, liquorice, and local produce.

Barley (*Hordeum*), a genus of grasses represented by several wild species, and by several cereals, the wild forms of which are not exactly known. It is characterised by having its spikelets in two rows, one on each side of the rachis, with three flowers in each spikelet, and long awns to their glumes. The two chief species are *H. hexastichum*, the six-rowed barley, in which all the flowers are perfect and fertile, and *H. distichum*, the two-rowed, in which only the central flower in each spikelet produces a grain. Barley has been cultivated from very early times, and is largely ground into *meal* as food for pigs, and still more largely converted by artificially-stimulated germination into *malt*, from which beer is prepared by infusion and fermentation, and gin and whisky by distillation. When the fibrous coats of the grain are more or less completely removed it forms *Scotch* or *pot barley* and *pearl barley*. Barley is hardier than either wheat or oats.

Barlow, PETER, born at Norwich in 1776, and almost self-educated, became in 1806 mathematical teacher at the Royal Academy, Woolwich, and held the post for forty years. In 1820 his *Essay on Magnetic Attractions* won for him the Parliamentary grant for discoveries and useful navigation. In 1823 he was made F.R.S., and in 1825 took the Copley Medal for his magnetic investigations. He contributed largely to the *Encyclopædia Metropolitana*, dying in 1862.

Barlow, THOMAS OLDHAM, R.A., born at Oldham in 1824, was educated as an engraver at Manchester, where he distinguished himself at the School of Art. Coming to London, he engraved *Courtship* by John Phillip, R.A., and later on produced the well-known plates from Millais' pictures, *The Huguenot*, *My First Sermon*, *Awake*, *Asleep*, etc. In 1882 he was elected to the Royal Academy. He died in 1889.

Barm. [YEAST.]

Barmecide Feast. In the *Arabian Nights* it is related that a member of the Barmecide family invited a starving beggar to a feast, and set empty dishes before him, giving each some magnificent name. The beggar entered into the joke so well that his entertainer caused the imaginary banquet to be followed by a real one.

Barmecides, a Persian family descended from Barmak, a physician and priest of Balkh. The famous Haroun Alraschid was educated by Khâlèd, a member of the family, whose son Yáhya became his grand vizier on his accession in 786. Yáhya's four sons also held high office under the same caliph, who suddenly became jealous, it is probable, of their power and popularity, though various accounts of the circumstances are given, and according to some accounts had the whole family massacred (802 A.D.). Their splendour was a frequent theme of oriental poets.

Barmen, a town in the district of Elberfeld, Rhenish Prussia. It stretches in a series of hamlets for six miles along the Wupper Valley, and is remarkable for the rapid development of several industries, such as the weaving and dyeing of silks, cottons, and ribbons, and the manufacture of plated and polished metal goods.

Barmouth, a port in the county of Merioneth, North Wales, about eight miles W. of Dolgelly. The town occupies a picturesque situation on broken ground at the mouth of the Mawddach, and the neighbourhood is pretty. The patronage of bathers in summer, fishing, and a small local trade are the only sources of prosperity. Pop. (1901), 2,213.

Barnabas, SAINT, originally called JOSES, was a member of the tribe of Levi, and born at Cyprus in the first century A.D. At what precise date he adopted his name, signifying *son of prophecy* or *consolation*, is not known. He appears to have sold all his property and joined the Apostles, and he introduced Paul to the Church at Jerusalem (Acts ix. 26). About A.D. 42 he was sent to Antioch, where Paul joined him. Two years later he accompanied Paul to Jerusalem, and on their return journey was worshipped as Jupiter at Lystra. Later on the two apostles appear to have quarrelled about Mark, the nephew of Barnabas, and the latter, going to Cyprus, was there stoned to death. An epistle is extant which is said to be his work.

Barnabites, a society or order of clergy founded in Milan at the beginning of the sixteenth century, to engage in clerical work of various kinds under the direction of the bishops. Many distinguished men have belonged to the order, which has about twenty houses or "colleges" on the Continent, though none in England.

Barnacle. The Barnacle is one of the best known of the CIRRIPEDIA, and is the type of the

BARNACLES (*Lepas anatifera*).

family Lepadidæ; its generic name is *Lepas*. The larvæ are small free-swimming crustacea known as NAUPLIUS (q.v.), but during development they

attach themselves by the head to some usually floating body, such as wood or a ship's bottom. The adult consists of a long fleshy peduncle or stalk which bears a body protected by a multivalve shell. There are six pairs of appendages or limbs, which may be protruded through a slit between the pieces of the shell. By the movement of these limbs currents of water are established which bring the barnacle its food. They are all marine.

Barnacle Goose, or BERNICLE GOOSE (*Bernicla leucopsis*), a northern goose visiting Britain in the winter, frequenting the western rather than the eastern coasts, and returning north to breed. The adult male is about 25 in. long; bill black, with a reddish streak on each side, cheeks and throat white, neck black, upper parts marked with black and white, lower parts white. These birds are in high estimation for the table. Of this species and of the Brent goose (q.v.) it was formerly fabled that they were hatched from barnacles or produced from the "anatiferous trees" mentioned by Sir Thomas Browne. Sir R. Moray, in a paper published by the Royal Society in 1678, describes the perfectly-formed young geese which he fancied he had seen in the shell of the barnacle (q.v.). But it is worth recording that in the same year in Ray's edition of Willughby the story is gravely discussed, and as gravely refuted. In many cases the Brent goose is confounded with this bird, but where they are distinguished, the true barnacle goose is often known as the White-fronted, or Land Barnacle. The Red-breasted Goose (*B. ruficollis*), a native of Siberia, and a closely allied species, having the upper part of the breast a rich chestnut, is an occasional visitor. The Canada, or Cravat, Goose (*B. canadensis*), owing its popular name to a white patch on the neck, is domesticated in England, notably in Norfolk, and breeds with the common goose. Hutchins' Goose, or Barnacle (*B. hutchinsii*) is American, found as high as 60° N. lat., passing to the southern states in the winter.

Barnard, LADY ANNE, the daughter of James Lindsay, fifth Earl of Balcarres, was born in Fifeshire in 1750. She married Sir Andrew Barnard, librarian to George III. Not until late in life did she avow the authorship of the touching ballad *Auld Robin Gray*. She died in 1825.

Barnard, SIR ANDREW FRANCIS, G.C.B., G.C.H., born in Donegal, 1773, entered the army, served in the West Indies, and in the Helder expedition of 1799. Going out to the Peninsula he fought at Barrosa, Ciudad Rodrigo, Badajos, Salamanca, Vittoria, Nivelle, and Toulouse, being more than once wounded. He received a slight injury at Waterloo, and was appointed by Wellington to the command of the British troops in Paris. He died in 1855.

Barnard Castle, an old market town in the county of Durham, on the river Tees, 32 miles S.W. of Durham. It derives its name from the castle built there at the end of the twelfth century by Barnard Baliol, ancestor of John Baliol (q.v.). It was abandoned after a siege in 1569, but the massive ruins still cover six acres of ground. Sir Walter Scott laid the scene of parts of *Rokeby* in the neighbourhood. The parish church dates from the twelfth century, and there are almshouses said to have been founded by John Baliol. The Bowes Museum, left to the town by Sir George Bowes in 1874, contains some interesting relics. Carpets and woollen cloths are the chief manufactures, and the corn market is important. Pop. (1901), 4,421.

Barnave, ANTOINE PIERRE JOSEPH MARIE, was born at Grenoble, France, in 1761, and at the outbreak of the Revolution was sent to the National Assembly as deputy for Dauphiné. His eloquence and love of liberty soon brought him into prominence, and he was in 1790 elected president; but his popularity declined when it became apparent that he aimed at reforming rather than destroying the monarchy. He was sent as commissary to bring the king back from Varennes, and treated his prisoner with such respect that his presence was no longer tolerated in Paris. In 1792 some documents discovered in the famous Iron Chest showed that he had corresponded with the royal family. He was seized, and after fifteen months' imprisonment was sent to the guillotine in Paris.

Barnes, THOMAS, born in 1786, entered the service of the *Times*, and in 1815 became editor. His abilities did much to put that paper in the high position it afterwards occupied. His health failed early, and he died in 1841.

Barnes, THE REV. WILLIAM, D.D., was born in the vale of Blackmore, Dorset, in 1800. After keeping a school at Dorchester, he was ordained in 1847, and from 1862 to his death in 1886 was rector of Winterbourne Cance. Throughout his life he was devoted to philology, and especially to the study of the dialect of his native county. He wrote three volumes of *Poems of Rural Life in the Dorset Dialect*, and others in various English idioms. Among his scientific efforts were *A Philological Grammar*, *An Anglo-Saxon Delectus*, *An Outline of English Speech-Craft*, *A View of the Roots and Stems of English*, *Studies in Early British History*, etc.

Barnet, or CHIPPING BARNET, a small town in Hertfordshire, eleven miles N. of London, on the Great Northern Railway. It has a church dating from the fifteenth century, and a grammar school founded by Queen Elizabeth. It has long been a favourite rural resort of Londoners, and is now being rapidly built over. The September horse and cattle fair is a very old institution, and attracts large crowds of the costermonger class. On Gladsmore Heath close by was fought, April 14, 1471, the great battle in which the Lancastrians were utterly crushed, and the Earl of Warwick was killed. An obelisk, set up in 1740, commemorates the event. East Barnet is an adjoining parish. Pop. (1901), 7,876.

Barnet Fryern, a small town in Middlesex, on the Great Northern Railway, eight miles N.W of London. It has a rapidly increasing population owing to the growth of suburban residences.

Barnett, JOHN, was born at Bedford in 1802. In 1834 his first great attempt at English opera,

The Mountain Sylph, was produced at the reopening of the New Lyceum, and proved a solid success. *Fair Rosamond* next came out at Drury Lane, and *Farinelli* followed in 1838. In 1841 he established himself as a teacher in Cheltenham, and prospered. Among his later operas is *Kathleen*, and his fugitive works may be reckoned by thousands. He died in 1891.

Barnett, JOHN FRANCIS, nephew of the preceding, born in 1838, was Queen's scholar at the Royal Academy of Music, and afterwards studied at Leipzig. In 1864 his *Symphony in A Minor* attracted notice, and in 1867 a cantata, performed at Birmingham, *The Ancient Mariner*, established his reputation. Among more recent successes are *Paradise and the Peri*, *The Lay of the Last Minstrel*, and *The Good Shepherd*.

Barneveldt, JOHANN VAN OLDEN, was born of a distinguished Dutch family at Amersfoort in 1549. At the age of twenty he was made councillor and pensionary of Rotterdam, and in 1573 took an active part in the defence of Haarlem against the Spaniards. In 1585 he went as ambassador to England, and succeeded in obtaining the military support of Elizabeth, for which he was appointed Advocate-General, and subsequently became Grand Pensionary of Holland and West Friesland. When Maurice, Prince of Orange, as Stadtholder, revealed a dangerous ambition, Barneveldt opposed him, and in 1609 concluded the treaty with Spain that virtually assured the independence of the United Provinces. Maurice roused the antipathy of the Calvinists against his democratic opponent, who was an Arminian, and in 1618 Barneveldt was condemned to death by the Synod of Dordrecht as a heretic and a traitor. He was beheaded in 1619. His sons, William and Réné, conspired to avenge his death, but their designs were frustrated, and the latter was executed, the former making good his escape.

Barnfield, RICHARD, was born about 1574, and educated at Oxford. In 1594 he published *The Affectionate Shepherd*, and a year later *Cynthia*, which contained the lines "As it fell upon a day," included also in Shakespeare's *Passionate Pilgrim*, bearing the same date. Barnfield appears to have reasserted his claim by reprinting the poem, slightly altered, in 1605, under the title *Encomion of Lady Pecunia*. He probably died soon after.

Barn Owl (*Aluco flammeus*, the *Strix flammea* of some naturalists), a fairly common British bird, building in churches, barns, ruins, and hollow trees. The adult male is about 14 in. long, facial disc nearly white, and defined by the outer feathers being tipped with brown; head and neck light buff with black and white spots; back and wings deeper buff, with grey, black, and white spots; tail buff, broadly barred with grey; under surface white, but fawn in young males and females. The barn owl is essentially a farmers' friend, for the number of rats and mice that one of these birds will devour would be almost incredible were it not established by the most conclusive evidence—examination of the pellets of undigested food cast up. This bird is also called the white owl from its light-coloured plumage, and is the screech-owl of popular superstition.

BARN OWL (*Aluco flammeus*).

Barnsley, or BARNESLY, a market town and municipal borough in the West Riding of Yorkshire, 18 miles N. of Sheffield, near the river Dearne, and on the Midland, the Manchester, Sheffield and Lincoln, and the Lancashire and Yorkshire Railways. Damasks, drills, linen yarns, and glass are the staple manufactures. There are large bleaching grounds. The neighbourhood is rich in iron and coal, the coal-field extending under the town itself. It gives its name to a Parliamentary division of the county. Pop. (1901), 41,083.

Barnstaple, a port and municipal borough in North Devon, 40 miles N.W. of Exeter, on the river Taw. It is said to have been a borough since the reign of Athelstan in the tenth century, and was once a great centre of the wool trade. It has manufactures of pottery, lace, and gloves. Through the silting up of the river, Barnstaple has lost much of its trade. Until 1885 it returned two members to Parliament, but the representation is now merged in the county. Pop. (1901), 14,137.

Barnum, PHINEAS TAYLOR, was born at Bethel, Connecticut, U.S.A., in 1810. After engaging in several lottery and newspaper speculations he came to New York in 1834, and there picked up an old negress, Joyce Heth, whom he showed for some months with much success as "Washington's Nurse." In 1844 he secured the famous dwarf, General Tom Thumb, with whom he made the tour of the world, realising a great sum. Five years later he engaged Jenny Lind for a hundred concerts in the States, and, having earned what seemed to him a fortune, devoted his energies to creating the town of East Bridgeport in his native state. For many years he kept a "Museum" of living and other curiosities in New York, embracing at various times white whales, walruses, a mermaid (so-called), a living "missing link" between man and the ape, dwarfs, giants, and the "bogus baby"—which had been produced as supplying a motive for a celebrated murder, with the actors in which it had no connection in reality. It was not before 1871 that he started the huge circus or travelling show that ultimately proved a mine of wealth, one of his

greatest hits being the purchase of the elephant Jumbo from the Zoological Gardens. In 1889 he visited London, but the enormous expense of the enterprise is believed to have entailed a heavy loss. Barnum was a kind-hearted, free-handed humbug, temperate in his habits, full of cheery anecdote, and never depressed by misfortune. He died at Bridgeport on April 7, 1891, leaving a million of dollars, earned by hard work and innocent deception of the public.

Baroach, or BROACH, a district and its capital in Gujerat, British India, under the jurisdiction of the governor of Bombay. The district has an area of 1,319 square miles. The town, 36 miles N. of Surat on the river Nerbudda, is in a dilapidated condition, but does some trade in cotton, grain, and seeds. It contains a famous Hindu pinjari pole, or asylum for every kind of living creature, the killing of which is forbidden by the Brahminical code.

Baroda, the capital of the Gaekwar's dominions in Western India, and the residence of the British political agent appointed by the Bombay Government. It is situated on the river Biswamnitri, 231 miles N. of Bombay, with which it is connected by railway, and is surrounded by a double wall with towers. The Hindu temples are remarkably fine, and a considerable trade is done in the bazaars. A British force of some strength is quartered here.

Barometer, an instrument for the measurement of atmospheric or other gaseous pressure. It is of varied and extensive use in science. Observations of the variations in the atmospheric pressure frequently enable us to make accurate weather forecasts [METEOROLOGY]; hence the term weather glass. Heights of mountains can be estimated from the amount of diminution in pressure as one ascends into the rarer regions of the air. [HYPSOMETRY.] Again, many of the physical properties of gases are dependent on the pressure to which they are subjected, thus rendering the accurate measurement of this pressure an essential in the quantitative study of the gases.

These instruments are of two types, the Aneroid and the Torricellian. The former is comparatively new, but is perhaps simpler in principle. It was invented in 1844, and depends for its working on the fact that a closed box from which the air is removed has the tendency to become compressed by the external pressure of the surrounding atmosphere. If made of flexible material, the diminution in volume of the box may be rendered sufficiently great to admit of exact measurement. When the external pressure varies so does the volume of the box, which therefore behaves as a sensitive spring subjected to a varying stress. In practice the Aneroid barometer is made somewhat drum-shaped, the drum membranes being represented by circular discs of thin corrugated steel. The drum is attached to the casing of the instrument by one of these discs; and at the centre of the other a spring is fixed so as to prevent too great a collapse of the box. The slight motions of this spring, when the external pressure varies, are magnified by a light bent lever, which by a simple mechanism actuates the pointer on the dial face. The dial is graduated in inches of mercury, corresponding to the graduation of a Torricellian barometer. The Aneroid has the distinct advantages of lightness, compactness, and durability, but is not capable of such accuracy as may be obtained with the mercurial barometer.

The second type depends on the principle of the gaseous pressure being able to support a definite height of liquid. If a long glass tube closed at one end be filled with mercury, and then turned mouth downwards into a cistern of this liquid, it will be found that a definite length of mercury will still remain in the tube, kept in position by the pressure of the surrounding air on the surface of the liquid in the cistern. If the tube be of a length exceeding 30 inches, an empty space will exist in the upper part of the tube. This is known as the Torricellian vacuum, and the apparatus, provided with a vertical scale, constitutes a Torricellian barometer.

TORRICELLIAN BAROMETER.

When gas of any kind is introduced into this space a lowering of the mercury column is produced, by reason of the gaseous pressure within partially neutralising the external pressure. Hence the necessity of preserving the vacuum as perfect as possible. The ordinary British standard of atmospheric pressure is that which will balance 30 inches of pure mercury at Greenwich. The metric standard is equivalent to 76 cm. of pure mercury at Paris, *i.e.* 29·922 inches. It is necessary in exact work to specify the latitude where the barometric height is taken, since the weight due to a given height of mercury varies at different parts of the earth. Slight corrections are also necessary for expansion of the mercury column and of the metal scale, due to temperature changes. Many refinements are introduced in the more accurate instruments, which readily give the barometric height, measured from the mercury level in the cistern, correct to the $\frac{1}{1000}$ of an inch.

Barometz or *Baranetz*, the Tartarian lamb, once supposed to be a lamb which grew on a stem in the steppes west of the Volga, is merely the rhizome, or prostrate stem, of a tree-fern (*Cibotium Barometz*), which is covered with yellow silky scales, and has a soft reddish fleshy interior. When inverted with four leaf-stalks retained as legs it does resemble a lamb. The silky down is the *poco sempic* or *golden moss* used by the Chinese as a styptic, its threads absorbing the serum of blood by capillary action, and thus rapidly coagulating it.

Baron, A (sometimes called a "temporal baron" when mentioned in contradistinction to a bishop, who is a "spiritual baron"), is, as we now understand the word, one holding the lowest rank in the peerage, or, in other words, one bearing the lowest hereditary title which carries with it the privilege of voting in the Upper House or in the elections of representative peers. The dignity ranks next in nobility, honour, and precedence to that of a bishop. At the present time there are existing in England

"baronies by writ" and "baronies by patent"; anciently there were also "baronies by tenure" of certain lands, but it is believed that there are none such now in existence. A baron "by writ" is one "unto whom a writ of summons in the name of a Sovereign is directed (without a patent of creation) to come to the Parliament appointed to be holden at a certain time and place, and there to treat and advise with his Sovereign, the prelates, and nobility about the weighty affairs of the nation."

A barony by writ is a much older form of the dignity than a barony by patent, and is heritable and enjoyable by females, descending in every case to the "heir-general." In England, in the case of two or more coheiresses, the barony falls into abeyance between them until the death without issue, or the failure of the issue of all the daughters save one, when the heir of this one inherits. But the Sovereign has the power (and the prerogative is not unfrequently exercised) of "terminating" the abeyance, as it is called, in favour of any descendant of the last baron whom he or she may think fit. In Scotland, however, the eldest daughter inherits at once. Barons by writ take precedence according to the date of the writ of summons, but the exact origin of a good many titles is shrouded in much uncertainty. Baronies by patent were first created by King Richard II., and are those which originate with letters patent, the title in each case descending strictly in accordance with the limitations contained therein, and usually confined to the "heirs male." All barons at the present day are created by patent, with the rare exception of such an one as may be summoned to Parliament during the lifetime of his father, in one of his father's baronies already existing. A peer is entitled to display his armorial bearings, with the helmet, coronet, and mantle of his degree, and will also use supporters, which descend with the title. A baron is usually known as "Lord ——," and his sons and daughters are addressed in writing as the "Hon. ——."

Peers of Scotland rank next to the peers of England, and before those of Great Britain; and peers of Ireland created before the Union take place before peers of the United Kingdom. Those of England and the United Kingdom have seats in the House of Lords; and all peers of Scotland and Ireland have votes at the election of Scottish and Irish representative peers respectively. But many peers of Scotland and Ireland have in addition English titles, under which they sit and vote in the English Parliament. The chief privileges, in addition to his right of voting, which a peer enjoys are, that he is free from arrests for debt, and no attachment lies upon his person, though execution may be taken upon his goods and lands. He is exempted from serving the office of sheriff; and in criminal cases he is tried by his peers, who give their verdict not upon oath, but upon their honour.

By a law against "*Scandalum magnatum*," dating from 1275, any man convicted of making a scandalous report against a peer of the realm, *though true*, is condemned to a fine, and to remain in prison until the same be paid. [For Barons of Exchequer, *see* EXCHEQUER.]

Baron, BARONY. The word baron is of great antiquity, and has in England and Scotland always denoted one belonging to a particular class. The barons were those who held lands of a superior by military or other honourable services, and were bound to do homage in the courts of their superiors and to assist in the business there transacted. The court in which these tenants performed their services is known as the Court Baron, more precisely "The Court of the Barons." Baron is the most general and universal title of nobility, for anciently everyone of the peers of superior rank had also a barony annexed to his other titles. Earls and barons were the only titles of nobility at the time of the Conquest, and in the character of barons most of the peers temporal and spiritual sit in Parliament. "But it has sometimes happened that when a peer with barony annexed has been raised to a new degree of peerage, in the course of a few generations the two titles have descended differently, one, perhaps, to the male descendants, the other to the heirs general; whereby the earldom or superior title has subsisted without a barony. And there are also modern instances where earls and viscounts have been created without annexing a barony to their other honours, so that the rule does not universally hold that all peers are barons." (Stephen's *Blackstone's Commentaries.*)

Baron and Femme is a term used to express the *impaling* or conjunction of the individual coat-of-arms of a husband and wife when placed side by side. If both are upon one shield, the husband's coat occupies the dexter half (which is that on the left-hand side when facing the escutcheon), and the wife's the sinister. If the wife be of higher rank than the husband, or if the latter be a knight of any order or a bishop, and in one or two other exceptional cases, two separate escutcheons are used to display the joint armorial bearings. The arms of a wife when an heiress are in any case disposed in a different manner.

Baronet. This title, which is strictly hereditary, according to the limitations contained in each separate patent, was created by King James I. on the 22nd day of May, 1611, in order to raise money for the colonisation of Ulster. Originally the whole order was limited to 200 persons, and it was then intended that no further creations should be made, even for the purpose of filling up vacancies. But in the reign of King Charles II. the list was increased to the number of 888, and during the last four or five reigns the number has been unlimited, and the ancient qualifications are now dispensed with. The great rule, upon the institution of the order, was that none should be admitted but those who could prove descent from a grandfather at least on the father's side who bore arms and had a clear annual revenue from lands of £1,000; further, they were required to produce good proof that for quality, state of living and good reputation they were worthy of the honour, and the names upon the first list of baronets are all those of persons in every way highly respectable. A baronet upon his creation is required, under the terms of a royal warrant of

King George III., to prove his armorial bearings, to which is then added the badge of Ulster—the bloody hand,—and to place his pedigree upon record at the College of Arms.

The order of baronets of Nova Scotia was first created by King Charles I. for the plantation and cultivation of the province of Novia Scotia in America, and the sum of £3,000 was the amount payable for this dignity. Since the legislative union between Great Britain and Ireland, the separate orders of baronets have been superseded by one general institution of baronets of the United Kingdom. Though officially styled "Dame," the wife of a baronet is always known and addressed by the title of "Lady." Dame Maria Bolles, of Osberton, in the county of Nottingham (in the reign of King Charles I.), is the only lady upon whom a baronetcy has ever been conferred.

Baronius, CÆSAR, born near Naples in 1538, became an Oratorian, and was ultimately superior of the order. Subsequently he was appointed librarian at the Vatican and confessor to Clement VIII. He would probably have been elected Pope but for the intrigues of the Spanish party. In 1596 he received a Cardinal's hat. He spent thirty years in the compilation of his *Annales Ecclesiastici*, a history of the first twelve centuries of the Church. His death took place in 1607.

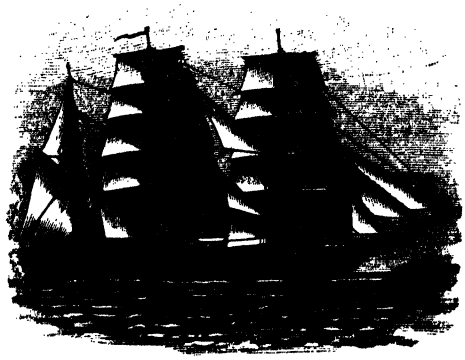
Barons' War. The misgovernment of Henry III., and the multitude of foreigners he had appointed to high posts in Church and State caused his barons to arrange a scheme for his control by a commission from among their own number (by the Provisions of Oxford, accepted by the king in 1258). The disputes between the king and this baronial council culminated in war in 1263. After two ineffectual attempts at settlement, the Battle of Lewes, May 14, 1264, resulted in a victory for the barons, and was followed by the summons by their leader, Simon de Montfort, of the first true English Parliament, containing representatives of all classes of the people. Divisions among the barons, however, led to the total defeat of Simon de Montfort at Evesham, August 4th, 1265. The war lasted on for two years, however; Kenilworth surrendered in 1266, and Ely, which had been seized for the barons in that year, was taken in 1267. Its capture by Prince Edward (afterwards Edward I.) ended the war.

Barony, the old English term for a MANOR. In Ireland a barony is the largest subdivision of a county. In Scots law, rights of barony were granted by the Crown, and until 1745 involved criminal as well as civil jurisdiction, while till 1847 they involved control over privileges to trade.

Baroque (Port. *barrocco*, a rough, irregular pearl), a term applied to that irregular and incongruous style of architecture which flourished, especially in Italy from the 16th to the 18th centuries. Following on the classical revival of the Renaissance, it is nevertheless characterised by fantastic and exaggerated ornamentation, and by violation of many of the ordinary canons of classical architecture. Many Jesuit churches are erected in this style.

Barouche (Latin *birotus*, two-wheeled), a carriage capable of accommodating four persons inside, with a seat outside for the driver. The top can be raised or lowered at will; the *barouche* has now four wheels.

Barque, or BARK, any small ship, but especially a vessel, small or large, with three masts, the fore and main of which are rigged as in a ship, but the



BARQUE.

mizzen is rigged fore-and-aft. Colliers further apply the name generally to broad-sterned ships without figure-heads. The Bombay barque is a vessel navigable by paddles, but having a single mast which rakes forward and carries a long yard.

Barquentine, or BARKENTINE, a vessel with three masts, the fore rigged like that of a ship, the main and mizzen carrying fore-and-aft sails only.

Barquesimeto, a province and city in the state of Venezuela, South America. It is on one of the upper tributaries of the Orinoco, and was founded by the Spaniards in 1522. Formerly a well-built and prosperous place, it was almost entirely destroyed by earthquake early in the 19th century. The area of the province is 9,305 sq. miles. The breeding of mules and horses is the chief industry.

Barra, or BARRAY, one of the Hebrides (q.v.) or Western Isles of Scotland, included in Inverness-shire; lying about 5 miles S.W. of South Uist, with a length of 8 and a breadth of from 2 to 4 miles. The fisheries are important, cod, ling, herrings, and shellfish being very plentiful. Lying in the course of the Gulf Stream its shores intercept many wrecks drifting from the Atlantic. The lighthouse, 680 feet above sea level, is the loftiest in Great Britain, and is visible for 30 miles. The population consists chiefly of Gaelic-speaking Roman Catholics.

Barrackpore, or BARRACKPUR, a subdivision and its capital, in Bengal, on the Hooghly, 16 miles N.N.E. of Calcutta. The Lieutenant-Governor of Bengal has a residence here, as have many Europeans, owing to the healthiness of the climate. The cantonments, established in 1772, probably gave the place its name, and are occupied by a strong force.

The mutiny of 1857 first broke out in them. Hindus make up half the population, the rest being Mohammedans and Christians.

Barracks (Spanish *barraca*, a hut), the buildings, now usually of substantial character, in which officers and men are housed at military stations.

Barramunda, the native Australian name of *Ceratodus forsteri*, and of some other large-scaled fresh-water fishes. [CERATODUS.]

Barranquilla, or BARANQUILLA, a city in Bolivar, United States of Colombia, South America, on left bank of the river Magdalena, whose estuary provides an excellent harbour. It is 68 miles N.E. of Cartagena, and enjoys a considerable trade.

Barras, PAUL FRANÇOIS JEAN NICOLAS, COMTE DE, was born in Provence in 1755, of a good family, entered the army and served at the defence of Pondicherry. On his return home he led an irregular life, adopted revolutionary views, and took part in the capture of the Bastille (1789). He was sent to the Convention in 1792 as representative of the Var, and at once acted with the Montagnards. Sent as commissioner to the siege of Toulon, he there recognised the abilities of Bonaparte, then a captain of artillery. In 1794 he was entrusted with the military control of Paris, and put an end to the career of Robespierre and the Reign of Terror. On the 13th Vendémiaire, 1795, with Bonaparte's help he crushed the reactionaries, and on the establishment of the Directory he formed with Rewbell and La Réveillère the Triumvirate that, in 1797, rendered itself supreme by the *coup d'état* of the 18th Fructidor. The triumph was short-lived, for on the 18th Brumaire, 1799, Bonaparte swept away the Directory, just as Barras was conspiring for the return of the Bourbons, and he had to fly to Brussels. He returned at the Restoration, and died, quite forgotten, at Chaillot in 1829. His private character was dissolute, and his public conduct venal and corrupt.

Barratry, or BARRETRY, the offence of frequently inciting and stirring up suits and quarrels between His Majesty's subjects, either at law or otherwise. The punishment is by fine and imprisonment, and if the offender belong to either branch of the legal profession (as is very often the case) he may be disbarred, or struck off the rolls of the Courts. By an Act passed in the twelfth year of the reign of George I. (c. 29) it was enacted that if anyone who hath been convicted of forgery, perjury, subornation of perjury, or *common barratry*, shall practise as solicitor or agent in any action, the Court upon complaint shall examine the case in a summary way, and on proof the offender may now be sentenced to penal servitude for not more than seven or less than five years. Barratry also specially signifies any act of the master or mariners of a ship which is of a criminal or fraudulent nature, and affecting the owners of the ship, such as desertion of the ship or embezzling the cargo. The term in the above sense is not known in Scots law, but Barratry in Scotland is the offence of a judge who has accepted a bribe from either party to a suit in order to induce his judgment in their favour.

Barré, ANTOINE, or ANTONIO, for it is doubtful whether he was French or Italian, was engaged in the profession of music at Rome in 1550. With the assistance of Onofro Vigili he established, in 1555, a press for printing music, whence he published his own and other compositions. Subsequently he seems to have carried on business at Milan and perhaps at Venice.

Barré, ISAAC, COLONEL, of French extraction, born at Dublin, entered the army and served in Canada under Wolfe. He got into Parliament in 1761, and was appointed Privy Councillor in 1766. He played a conspicuous part in the politics of the last half of the century in connection with the elder and younger Pitt. He is one of the many persons to whom the *Letters of Junius* have been ascribed. He died in 1802.

Barrel, a cylindrical vessel or cask, usually larger in the middle than at the ends. It is also used as a measure of capacity, customary in England (though no longer legal) for various kinds of goods. Thus the barrel of beer contains 36 imperial gallons; the barrel of herrings about 800 fish; the barrel of flour, 196 lbs.; of gunpowder, 100 lbs.; of rice, 600 lbs. In America it is a customary measure of flour (196 lbs.) and beef (200 lbs.). The name is also applied to various cylindrical parts of machinery —the case of the mainspring of a watch, the main part of a capstan, the chamber within which the piston of a pump works, the tube of a lock which receives the key, and sometimes colloquially to the body of an animal, as contrasted with the head and limbs.

Barrel Organ. In the familiar instrument of street musicians the turning of a handle works a bellows, and moves a cylinder studded with pins, which open and close valves admitting air from the bellows to pipes. In the barrel piano the pins strike on wires, which take the place of pipes.

Barri, or BARRY, GIRALD DE (better known as Giraldus Cambrensis), was born at Manorbier, Pembrokeshire, in 1146, his father being a noble Norman and his mother a Welsh princess. He was educated in Paris, and in 1172 took holy orders, becoming legate of the Archbishop of Canterbury in Wales. He displayed in this capacity rather too much zeal, and when the bishopric of St. David's fell vacant Henry II. refused to confirm his election. After a second visit to France he became tutor to Prince John, whom he accompanied to Ireland, collecting the materials for his *Topography of Ireland* and *Conquest of Ireland*. He next was engaged in preaching the crusade, and in 1189 accompanied Henry II. to France. Richard I., on departing for Palestine, appointed him co-regent of England. In 1198 the See of St. David's again became vacant, and he was elected, but the Pope supported a rival claimant, and six years were spent in vainly asserting his rights at Rome and in England. Finally he retired from all ecclesiastical office and lived at St. David's till 1220 in literary retirement, refusing

the bishopric when it was offered to him. He wrote, besides the works mentioned above, an *Itinerary and Description of Wales*, *Ecclesiæ Speculum*, a censure on monkish morals, *De Rebus a se Gestis*, a journal throwing light on his own character, and many smaller tracts. He was vain, headstrong, and prejudiced, but possessed learning, independence, power of observation, and purity of mind.

Barricade (the name is Spanish, probably from the barrels, Spanish *barrica*, originally used in their construction), an improvised fortification of paving stones, timber, or other material, best known in connection with the history of Paris. In 1588 troops marched in by Henry III. to terrorise the populace were fired at from behind barricades and suffered heavy loss. In the "three days'" revolution of 1830 some thousands of barricades were erected in Paris, and also during the revolution of 1848, and especially in June, 1849. The "Haussmannisation" of Paris, under Napoleon III., with its wide streets and asphalt pavements, was intended to prevent barricading, but many were built in 1871.

Barrie, James Matthew (b. 1860), after holding a position as journalist in Nottingham, came to London. Among his better-known works are *A Window in Thrums* (1889), *The Little Minister* (1891), *Sentimental Tommy* (1896), *Tommy and Grizel* (1900), and *The Little White Bird* (1902). He has also written several successful plays, of which *Peter Pan* is the best known.

Barrière, or La Barre, Pierre, born in a humble station at Orleans about the middle of the sixteenth century, conceived the project of assassinating Henry IV. He revealed his design to Banchi, a Dominican, who betrayed him. Seized at Melun on the eve of executing his design, he was broken on the wheel in 1593.

Barrier Reef, The Great, an immense reef of coral, which, beginning at Torres Strait, extends for 1260 miles S.E., and forms a smooth water channel varying from 10 to 100 miles in breadth along the E. coast of Australia. Though intricate and dangerous in its narrower parts, this passage is of inestimable value to navigation off a shore that would otherwise be exposed to all the fury of the Southern Ocean. There are several openings in the reef into the open sea.

Barring Out. Up to the end of the 18th century it was a more or less recognised custom at English and Scottish schools that the boys should fortify themselves in the schoolroom, and dictate terms to their master as to the length of their holidays and other matters of school discipline. Addison is said to have captained the besieged in one of them, and a story of Miss Edgeworth's takes a "barring out" for its theme.

Barrington, John Shute, Viscount, was born at Theobalds, Herts, in 1678, his family name being Shute, which he exchanged for Barrington on inheriting a fortune. He was educated at Utrecht, where he wrote sundry Latin essays on law and theology. On his return he became an authority on the rights of Protestant dissenters, and was employed by Somers in various capacities. On the accession of George I. he represented Berwick in Parliament, and to gratify the king connected himself with the Harburg lottery. He was elevated to an Irish peerage, but when the scheme proved disastrous was expelled from the House of Commons (1723). He spent the rest of his life in retirement, writing *Miscellanea Sacra*, *A Discourse on Natural and Revealed Religion*, and many papers in favour of toleration. He died in 1734.

Barrington, The Honorable Daines, fourth son of the foregoing, born in 1727, was educated at Oxford and called to the bar. He held a variety of appointments such as the secretaryship of Greenwich Hospital, a Welsh judgeship, and the office of Commissary-General of Gibraltar. In 1752 he prosecuted the famous Miss Blandy for her father's murder. He published in 1766 a valuable project for ridding the law of obsolete statutes, but his labours in popularising the idea of the discovery of the North-West Passage were more fruitful. Natural history, and especially ornithology, was a passion with him, and he wrote many detached papers and contributions to *Philosophical Transactions*. He died in the Temple in 1800.

Barrington, The Hon. Samuel, fifth son of the first Lord Barrington, was born in 1729, and entered the navy in 1740. He attained the rank of captain in 1747, when little more than eighteen, and in command of the *Bellona*, 30, distinguished himself on Aug. 18th of that year by his action with and capture of the French East Indiaman, *Duc de Chartres*, 30. Later he was honourably concerned in the rescue of many British subjects from slavery in Morocco. In 1757 he took part in the futile expedition against Rochefort, and cruising afterwards in the Channel in the *Achilles*, 60, captured the *St. Florentine* of equal force. In 1761 Captain Barrington greatly signalised himself during Commodore Keppel's expedition against Belleisle. In 1768 he was appointed to the *Venus*, 36, and was entrusted for a season with the professional training of the Duke of Cumberland, one of George the Third's brothers. In 1777, in the *Prince of Wales*, 74, he made some prizes in the Channel, but being promoted early in the following year to flag-rank, proceeded to the West Indies. There, on Dec. 15th, he was attacked off St. Lucia by the Comte d'Estaing, whom twice on that day he drove back. Finally, though of greatly superior force, the enemy drew off, leaving the island to capitulate to the British. He commanded the van in Vice-Admiral Byron's action with D'Estaing off Grenada, on July 6th, 1779, and was wounded. Advanced in 1780 to the rank of vice-admiral, he in 1782 took command of the Channel fleet, and on April 13th met a French convoy and captured a 74, a 64, and twelve smaller vessels. In the autumn he sailed under Lord Howe as second in command, and assisted in the famous relief of Gibraltar and in the partial action of Oct. 20th. He became an admiral in 1787, and in 1799 General of Marines. He died in 1800.

BARRIER REEF.

CORAL ISLAND WITH BARRIER REEF.

Barrister, a counsellor learned in the law who pleads in Court and undertakes the advocacy or defence of causes. It is supposed the term Barrister arose in England from the arrangement of the halls of the different Inns of Court. The benchers and readers being the superiors of each house, occupied on public occasions of assembly the upper end of the hall, which was raised on a dais, and separated from the other part of the building by a bar. The next in degree were the utter barristers, who, after they had attained a certain standing, were called from the body of the hall to the bar (that is, the first place outside the bar) for the purpose of taking a principal part in the meetings or exercises of the house; and hence they probably derived the name of utter or outer barristers. The other members of the Inn, consisting of students of the law under the degree of utter barristers, took their places near to the centre of the hall and farther from the bar, and from this manner of distribution appear to have been called inner barristers. The distinction between utter and inner barristers has been long since abolished. The former are called barristers generally, and the latter students. A barrister is under the control of the benchers of his Inn; his fees are an honorarium, and no action lies to recover them, nor can security be given or taken for them. Conveyancers, or special pleaders below the bar (a very restricted body now) may, however, maintain an action or take security for their fees. The degree of serjeant (which ancient title could only be allowed after sixteen years' standing) formerly carried with it exclusive audience in the Court of Common Pleas. This was abolished in 1846, but the practice for all newly-appointed judges if not of the degree of the Coif to be admitted to that order before taking their seat on the bench was continued till a recent period, when, being found incompatible with the system introduced by the Judicature Acts, it was abolished, and now the title has become extinct. Another higher class of barristers is the "King's Counsel." They are from time to time selected on the nomination of the Lord Chancellor (the two principal of whom are the Attorney- and Solicitor-General). This advancement in the profession is known as "taking silk," and the King's Counsel thereafter appears in Court in a different style of gown from the outer barristers, and on special occasions wears a "full-bottomed wig," and sits within the bar. When a King's Counsel is retained against the Crown in any case he has to obtain a special licence for the purpose. In addition to the above, a practice has grown up in recent times of granting letters patent of precedence among themselves to such barristers as are thought worthy of that mark of distinction. Barristers with patents of precedence rank promiscuously with the King's Counsel, and sit with them, but they are not the sworn servants of the Crown, and consequently may appear against the Crown without any licence for that purpose. A counsel may on his client's behalf compromise the case without express instructions for that purpose. A barrister must be instructed by a solicitor, and his services are not obtainable without such instructions. [ATTORNEY-GENERAL, SOLICITOR-GENERAL.]

Barros, JOÃO DE, was born at Vizeu, Portugal, in 1496, and brought up at the court of King Emanuel. He showed great literary capacity, and was encouraged by the royal family to occupy himself with Portuguese history. John III. made him Governor of Guinea, and subsequently General Treasurer of all the colonies. He then composed his great work, *Asia Portuguesa*, consisting of forty books, his task being completed by Couto. His style is admired as remarkably pure and simple. He died in 1570.

Barrot, CAMILLE HYACINTHE ODILLON, born at Villefort in 1791, acquired fame as an advocate. Mixed up in the revolution of 1830, he accompanied the royal family to Cherbourg, and attached himself at first to the younger branch of the Bourbons. Under Louis Philippe he stood forth as leader of the "moderate left" in opposition to Guizot, and contributed not a little to the events of 1848. He then joined Thiers in a futile attempt to form a ministry favourable to the succession of the Comte de Paris. The project failing, he accepted (1849) the presidency of the Council under Louis Napoleon, who distrusted him and shelved him. He lived in retirement till 1872, when he was made councillor of state and vice-president of the council, dying in the following year.

Barrow, a burial mound of earth, differing only in the material from a cairn (q.v.), which is composed of stones. Barrows are sometimes called *tumuli*, a somewhat misleading name, for it does not necessarily imply any connection with burial (q.v.). The custom of heaping earth over the buried dead is probably older than the written history of the human race; at any rate it is mentioned in some of the earliest records (Homer, *Il.* xxxii. 175; Cæsar, *De Bello Gal.* iv. 19), and barrows are widely scattered all over the world; within a radius of three miles from Stonehenge (q.v.) more than 300 may be counted. The following account of a barrow interment of a Scythian king is abridged from Herodotus (iv. 71). As soon as the king dies a quadrangular trench is sunk, and the embalmed body is placed therein. In some other part of this trench they bury one of the deceased's concubines, whom they previously strangle, together with the baker, the cook, the groom, his most confidential servant, his horses, the choicest of his effects, and finally some golden goblets: to conclude all they fill up the trench with earth, and seem to be emulous in their endeavour to raise as high a mound as possible. Here we have the idea that the individual after death had the same wants as in life, and to provide for these, slaves and animals were slaughtered and food and implements deposited in the grave with the dead.

The barrows of northern Europe range from Neolithic to post-Roman times; indeed, they come down to the days of Charlemagne, for one of his edicts runs thus: "We order that the bodies of Christian Saxons be borne to the burying-places of the church, and not to the barrows of the pagans." None, however, can be referred farther back than the New Stone Age, for they never contain remains

of extinct mammals, nor of the reindeer [REINDEER AGE], nor have any Palæolithic implements been discovered.

Barrows are sometimes divided into chambered and unchambered [MEGALITHIC STRUCTURES]; but a complete burial-place was a *dolmen*, covered with a mound and surrounded with a circle of

BARROW ON BALLIDON MOOR, DERBYSHIRE.

standing stones. A dolmen is a flat stone laid horizontally, or nearly so, on two or more upright stones, and is nothing more than a burial-chamber from which the earth that formerly covered it has been removed by denudation, as is the case with Kit's Coty House, between Rochester and Maidstone. These structures were formerly called *cromlechs*, a term now disused in England, but still employed in France for what British authors call Stone Circles (q.v.).

According to Bateman (*Ten Years' Diggings in the Celtic and Saxon Grave-hills*), the fundamental design of British barrows (with the exception of a few chambered or galleried mounds) is that they enclose a rude stone vault or chamber, or a stone chest called a *cistvaen*, built with more or less care; and in other cases a grave cut out more or less below the natural surface, and lined, if need be, with stone slabs, in which the body was placed in a perfect state, or reduced to ashes by fire. Besides the remains of the buried or cremated corpse, there are found in British barrows: (1) Stone or bronze implements or ornaments; (2) pottery (urns, incense-cups, food vases, and drinking-cups); and (3) bones of quadrupeds, indicating sepulchral feasts, and burnt human bones, proving that slaves were sacrificed at their masters' graves, and probably that widows were burnt with their dead husbands. [SUTTEE.] Of the British ante-Roman barrows, the long ones are supposed to belong exclusively to the Stone, and the round ones to the Bronze, Age. But the determination of the question of age, when not indicated by the presence of implements, is a very difficult one. Lord Avebury, after an extended review of the evidence, says that burial in a sitting or contracted posture marks the Neolithic period, cremation the Bronze Age, and the extended position of the corpse the Iron Age. The term barrow is by some writers loosely applied to memorial mounds, as were "the heap of witness" raised by Laban and Jacob (Gen. xxxi. 52), and the mound thrown up by the Ten Thousand in their celebrated retreat when they obtained their first view of the sea (Xenophon *Anab.* IV. vii. 25).

Barrow, a river in Ireland, which, rising in the Slievebloom Mountains, flows for 100 miles through Queen's Co., King's Co., Kildare and Carlow, and joining the Suir discharges itself into Waterford harbour. Its tributaries are the Nore, Blackwood, and Green rivers. It is navigable for 65 miles to Athy, where it is connected with Dublin by the Grand Canal.

Barrow, ISAAC, D.D., was born in London in 1630, being the son of Charles I.'s linen-draper. From the Charter House he passed to St. Peter's, and afterwards to Trinity College, Cambridge, and studied with a view to medicine. He then made a prolonged tour in Europe and in the Levant, and at Constantinople was influenced by reading the works of Chrysostom. On his return to England in 1659 he was ordained, and appointed to the chair of Greek at Cambridge, being later on chosen as Gresham Professor of Geometry, and elected F.R.S. From 1664 to 1669 he was Lucasian Professor of Mathematics at his university, but resigned in favour of his illustrious pupil, Isaac Newton, and devoted himself to theology. He received a prebendal stall at Salisbury, and in 1672 the king made him Bishop of Chester. He died in 1677, and was buried in Westminster Abbey. As a mathematician he showed ability, but not genius. His *Sermons*, the only important contribution he made to literature, are solid, erudite, and closely reasoned, but their heavy style is only relieved by occasional passages of eloquence.

Barrow, SIR JOHN, BART., born near Ulverstone in 1764, spent his early days as a clerk, but showing a turn for mathematics, got employment as a teacher, and presently was sent out in the suite of the first British Ambassador to China. His abilities were appreciated, and on coming home, in 1794, Lord Macartney took him to the Cape, where he exerted himself with great success among the Kaffres, recording his experiences in a valuable book. Lord Melville next appointed him second Secretary of the Admiralty, and for 40 years he held this post to the entire satisfaction of successive administrators, among whom was William IV., then Duke of Clarence. He was elected fellow of the Royal Society, and received a baronetcy in 1835. Retiring from office in 1845, he spent three years in compiling a history of recent Arctic explorations and in writing his autobiography. He died in 1848. Among his works were *Lives* of Macartney, Anson, Howe, and Peter the Great, besides many contributions to the *Encyclopædia Britannica* and the *Quarterly Review*.

Barrow-in-Furness, a town and port in Lancashire, 35 miles N.W. of Lancaster, at the extremity of the peninsula of Furness, which forms the northern boundary of Morecambe Bay. The

prosperity of the place depends on the abundance of iron in the district, but these resources have only been developed within the last fifty years by the chief landowners, the Dukes of Devonshire and Buccleuch, and Sir John Ramsden, a local pioneer of great energy and perseverance. The steel-works are the largest in the kingdom; the docks, opened in 1867, cover 69 acres; shipbuilding has grown to be an important industry; hundreds of thousands of tons of iron in various forms are annually exported; and the population in half a century has increased two hundredfold. The town, built chiefly on reclaimed ground, is well laid out, and returns a member to Parliament. Within the municipal boundary are the ruins of Furness Abbey, founded in 1127. Pop.(1909), 69,733.

Barry, SIR CHARLES, KNT., was born at Westminster in 1795, and after receiving the ordinary training of an architect, travelled from 1817 to 1820 in Italy, Greece, Egypt, and Palestine. He then speedily attained high professional reputation. Though his first important work, St. Peter's at Brighton, was in the Perpendicular Gothic style, he shewed a marked preference at first for the Italian school, as may be inferred from such examples as the Travellers' Club, the Reform Club, Bridgewater House, the Manchester Athenæum, and the Halifax Town Hall. His adoption of Tudor methods in King Edward's School at Birmingham proved an attractive success. After the destruction of the Houses of Parliament, in 1834, his designs were selected for the new buildings, which were begun in 1840 and completed in 1860, though occupied earlier. Barry, who died suddenly in the year his great task was achieved, had been elected R.A. and F.R.S., besides receiving many foreign distinctions, and he was knighted in 1852.

Barry, JAMES, was born at Cork in 1741, and received an ordinary middle-class education, early showing an aptitude for painting. Edmund Burke noticed his efforts, and enabled him to go abroad. Coming home, he painted a number of classical compositions, and *The Death of General Wolfe*. In 1777 he undertook to decorate the hall of the Society of Arts with the six paintings which are his chief memorials. In 1782 he was appointed professor of painting at the Royal Academy, but though his lectures were by no means deficient in common sense, he contrived to quarrel with his brother academicians, and was expelled in 1799. He was now in great poverty, and a subscription was opened for his benefit, but he died in 1806, almost as soon as he was freed from immediate difficulties.

Bar-sinister. Strictly speaking this is a misnomer for "bend-sinister." It is one of the honourable ordinaries in heraldry, and is formed by two parallel diagonal lines, containing a third part of the field, crossing the escutcheon from the top right-hand corner to the bottom left-hand side. In heraldic language this is from the sinister (hence its name) chief to the dexter base points, it being the exact opposite of the bend proper. Though another mark has now taken its place it was anciently the "difference" denoting illegitimacy, and in such meaning has become a very general term outside the limits of armory.

Bar-sur-Aube, a town on the right bank of the river Aube, in the department of the same name in France. It is an ancient and picturesque town, with St. Maclou, an interesting church, and remains of old fortifications. The district is famous for its vineyards. In 1814 Oudinot unsuccessfully opposed here the advance of the Allied army.

Bar-sur-Seine, a town in the department of Aube, France, 18 miles from Troyes. In the Middle Ages it was a place of wealth and importance, but it suffered greatly in the wars of religion. It is now insignificant, though some trade is done in wool, grain, wine, and brandy. A battle was fought here in 1814 between the Allies and the Napoleonic forces.

Bart, or BARTH, JEAN, one of the most famous and successful of French naval officers, the son of a fisherman of Dunkirk, where he was born in 1651. As a boy he served on board various armed coasters, and as a young man he went to Holland and fought under the celebrated De Ruyter. With him he acquired a little money, and was enabled to purchase a privateer of two guns, in which, in 1674, he cruised off the Texel, France and Holland being at that time at war. Bart's first exploit was the capture by boarding of a Dutch 18-gun sloop. This recommended him to the merchants of his native town. They subscribed to place him in command of the 10-gun sloop *Espérance*, in which he took a Dutch 12-gun ship, another Dutch 18-gun ship, and a large and valuable convoy. The merchants were so delighted that they next fitted out five vessels, and gave the command of the whole squadron to Bart. He sailed in 1676, and in that year and the next made numerous prizes. His repeated gallantry gained him the notice of Louis XIV., who rewarded him with a gold chain and medal, and a commission as lieutenant in the French royal navy. As such, but in command of a ship, he cruised, with his usual success, against the Barbary corsairs. In 1683, as captain of a frigate, he greatly distinguished himself in the action between the French and Spanish fleets off Cadiz, and in 1688 he was again in action with the Dutch, this time in company with another noted French seaman, the Chevalier Forbin. He also served against the English, but, with Forbin, had the misfortune to be taken prisoner and carried into Plymouth, whence the two officers promptly escaped. In 1690 Bart commanded the *Alcion* in De Tourville's fleet, and took part in the Battle of Beachy Head. In the following year, with Forbin, he cruised in command of a small squadron, made many captures, and was on his return made a *chef d'escadre*, or commodore. After the battle off La Hogue, in which he had no share, he again went to sea, breaking for a second time the English blockade of Dunkirk in order to leave port. He took rich prizes, made an alarming descent near Newcastle, killed the Dutch Admiral Devries and captured part of his squadron, and was, as a reward, ennobled. He went to sea more than once afterwards, but upon the conclusion of the Peace of Ryswick retired from the service. He died of pleurisy in 1702. Bart stands almost alone amongst French seamen. He was illiterate and rude, but he

was singularly brave, and, owing to the independence of his character, he was never bound by the traditions which have usually confined French naval operations. This is, perhaps, why he was so successful.

Bartas, GUILLAUME DE SALLUSTE DU, the son of a treasurer of France, was born in 1544. In the service of Henry IV. he went as envoy to England, Denmark, and Scotland, commanding also a troop of horse. He took to poetry, and his chief work, *La Sepmaine*, or *Week of Creation*, was translated into English by Sylvester, 1598. It won much admiration from Spenser, Ben Jonson, and the authors of the period, and exercised some influence on English literature. To modern taste it seems a most dull and pointless production. A second *Week* was published later. Du Bartas died in 1590 from wounds received at the battle of Ivry.

Barter, in *Law*, as in usage, is the exchange of goods for goods as distinct from their *sale* for money. It is the primitive form of trade everywhere; indeed, the propensity to barter is mentioned by Adam Smith as one of the chief traits which distinguishes man from the lower animals; and wherever the value of money is subject to great deprecintion (as in the case of over-issue of paper currency) it tends to reappear. But so soon as bills of exchange and other credit substitutes for money are invented, trade again tends to become essentially barter—since what is received in exchange is not money, but purchasing power over goods, a power expressed in terms of money for convenience sake. In political economy it is almost an axiom that, since the invention of bills of exchange, and in recent years of "cable transfers," foreign trade is barter of exports for imports, the differences only being paid in specie.

Barth, HEINRICH, born at Hamburg in 1821, and educated at the University of Berlin, started in 1845, after careful preparation, on a journey of exploration in North Africa, visiting Tunis, Tripoli, Barca, and the valley of the Nile. In 1847 he travelled through Egypt, Palestine, Asia Minor, and Greece, and two years later he published his book on the coasts of the Mediterranean. Bunsen procured him in 1849 the direction in connection with Overweg of an English expedition into Central Africa. After an absence of more than five years he gave to the world the results of his journey in a work entitled *Travels and Discoveries in Central Africa*. He again returned to the shores of the Mediterranean in 1858 and 1862, was appointed Professor of Geography in the University of Berlin in 1863, and died in 1865.

Barthélemy, AUGUSTE MARSEILLE, was born at Marseilles in 1796. Having won some name for versifying, he went to Paris, and in 1825 secured the patronage of the court by a poem called *Le Sacre de Charles X.* He then went over to the opposition, and in conjunction with Méry wrote *La Villéliade*, *Napoléon en Égypte*, and numberless other satires, which led to his imprisonment. The revolution of 1830 set him free, when the two friends published *L'Insurrection*, one of their happiest efforts. Though his attacks on the government continued, Louis Philippe gave him a pension, and in 1832 he suddenly became a supporter of the crown. His popularity declined, and, in spite of his return to his old principles in 1844, was never recovered. He died in 1867.

Barthélemy, JEAN JACQUES, born at Cassis, near Marseilles, in 1716, and entered the priesthood. He had a predilection for Oriental languages, and to this was added soon a taste for classical antiquities and numismatics. Coming to Paris in 1744 he became assistant to De Boze, the secretary of the Academy of Inscriptions, to whose office he succeeded. In a journey to Italy he acquired the friendship of the Duc de Choiseul, through whose influence he enjoyed several lucrative pensions. He spent thirty years from 1757 on the composition of his great work, *Le Voyage du Jeune Anacharsis*, the object of which was to throw into a popular form all that was then known of Greek archæology. His high reputation saved him from persecution during the Reign of Terror, and he died in 1795.

Barthélemy Saint Hilaire, JULES, was born in Paris in 1805, and began life as a journalist, being an active participator in the revolution of 1830. In 1833 he dropped politics and devoted himself to the translation of Aristotle, being appointed five years later to the chair of classical philosophy in the College of France. In 1848 he supported Odillon Barrot, but after the *Coup d'État* resigned his professorship and spent ten years in private study and travel. He was reinstated in 1862, remained in Paris during the siege, and in 1870 was elected deputy, giving his support to M. Thiers, and after his fall joining the moderate Republicans. In 1875 he was made a life-senator, and in 1880 became Minister for Foreign Affairs, in which capacity he took an active part in the occupation of Tunis. This policy led to the resignation of M. Ferry, and Saint Hilaire returned to his literary labours, acting as executor to M. Thiers and M. Cousin. Saint Hilaire also did much in the field of Oriental study. He died in 1895.

Barthez, PAUL JOSEPH, born at Montpellier in 1734, took his doctorate in medicine early, and went to Paris, where he was soon allied with the highest intellects, assisting D'Alembert in the famous *Encyclopédie*. After brief employment as medical officer of the army in Westphalia, he obtained a professorship of medicine at Montpellier in 1759. Here he remained till 1780, when he was appointed physician to the king, and Napoleon, as first consul, retained his services. His many scientific works show an accurate knowledge of anatomy, and of the mechanical and chemical branches of his profession, but he also recognised, under the name of Vital Principle, a physiological force as playing an important part in the functions of the human organism. He died in 1806.

Bartholdi, JACOB SALOMON, was born of Jewish parents at Berlin in 1779. After studying jurisprudence at Halle, he travelled for some years in France, Italy, and Greece. Adopting Christianity, he entered the Austrian army and served against

Napoleon. In 1815 he became Prussian consul-general in Italy, and subsequently ambassador at Florence. He made a valuable art collection which was purchased by the Berlin Museum, and he employed Cornelius, Overbeck, and other German artists to paint frescoes in his house at Rome. He wrote *A History of the Tyrolese War of* 1809, and *A Life of Cardinal Consalvi.* His death occurred in Rome in 1825.

Bartholin, or BARTHOLINUS, THOMAS, belonged to a Danish family distinguished in three generations for scientific attainments, and was born at Copenhagen in 1616. He studied medicine at Leyden, Paris, Montpellier, Padua, and Basel, and in 1648 was appointed Professor of Anatomy at Copenhagen. He devoted himself to researches as to the functions of the recently discovered lacteal and lymphatic vessels, till his health broke down in 1661. In 1670 a fire destroyed his house and library, upon which the king appointed him his physician; he was also made librarian of the university. He died in 1680.

Bartholomew, SAINT (Heb. *son of Tolmai*), was a native of Cana in Galilee, and is generally supposed to be identical with Nathanael (John i. 45, xxi. 2). The latter was introduced by Philip to Jesus, who on seeing him approach uttered the remarkable words, "Behold an Israelite indeed, in whom there is no guile." St. Bartholomew was present at the resurrection and ascension, returning with the other apostles to Jerusalem. Of his subsequent career we have only obscure traditions, according to which he went on a mission amongst the "Indians," with whom he left St. Matthew's Gospel in Hebrew. It is probable that Arabia Felix may have been the scene of his efforts. He is reputed to have suffered martyrdom either in Armenia or Cilicia by being crucified head downwards and being flayed alive. His festival is celebrated on August 24th, a day marked by inauspicious events, as it was chosen in 1572 by Charles IX. and his mother for the massacre of the French Protestants, and in 1662 the Act of Uniformity came into operation on that date in England.

Bartholomew, HOSPITAL OF ST., in Smithfield, London, was founded by Rahere in the year 1123. The hospital had originally three chapels, one of which is now known as St. Bartholomew the Less. Harvey, the discoverer of the circulation of the blood, was for thirty-four years physician to the hospital; Percival Pott, John Abernethy, Benjamin Brodie, and William Lawrence were also associated with its school. The number of beds, including the convalescent home at Swanley, is 744. In the year 1908 relief was afforded to 8,087 in-patients and to 131,923 out-patients. The medical school attached to the hospital numbers upwards of 400 students.

Bartholomew's Day, ST., is August 24th, rendered memorable by the great massacre of Protestants in France in 1572, by order of the Queen Regent, Catherine de Medicis. She had been apparently endeavouring to conciliate them, but at a time when the chief Huguenot notables were in Paris she persuaded the king that their leader, Admiral Coligny, sought his life, and he consented to a general massacre. Three strokes on a bell in the tower of the palace gave the signal, and bands of assassins, marked by a white badge on one arm, went forth to their task. Four thousand were slain in Paris, and according to various estimates from 30,000 to 70,000 were massacred altogether. The Pope and the Spanish Court received the news with enthusiasm; but the spirit of the Huguenots was only strengthened, and after a failure to take their stronghold, La Rochelle, Charles IX. was compelled to secure them that liberty of conscience which had been promised to them by the peace of St. Germain-en-Laye in 1570.

Bartizan, a small battlemented turret, pierced with loopholes, and projecting from the wall of a castle or fortress. The word is first used by Sir Walter Scott, and probably is the result of his misunderstanding of the term *bertisene*, a Scottish corruption of *bratticing*.

Bartlett, JOHN RUSSELL, was born at Providence, Rhode Island, U.S.A., in 1805. He was employed as commissioner for defining the Mexican boundary, and wrote an account of his experiences. He was the author of several works on ethnology and philology, and was well known as the author of the *Dictionary of Americanisms.*

Bartlett, WILLIAM HENRY, was born in 1809, and articled to John Britton, the well-known archæological architect, for whose works he did many drawings of English buildings. He next sought subjects in foreign countries, travelled over Europe, Asia, and America, and published about a thousand engravings, Dr. Beattie writing the explanatory text. Some of the more remarkable volumes were *Walks about Jerusalem*, *The Nile Boat*, *The Overland Route*, *Footsteps of Our Lord*, *Pictures from Sicily*, and *The Pilgrim Fathers.* He died on board ship in 1854, whilst travelling home from the East.

Bartolini, LORENZO, was born of a humble Tuscan family in 1777. He showed as a lad great skill as a modeller, and in 1797 went to Paris, where six years later he gained the second prize of the Academy for a group of Cleobis and Bito. Napoleon now became his patron, and sent him to found a school of sculpture at Carrara. After Napoleon's fall he resided in Florence till his death in 1850. His best works are *Charity*, *Hercules and Lichas*, and *Faith in God*, but he produced an enormous number of portrait busts.

Bartolommeo, FRA. [BACCIO DELLA PORTA.]

Bartolozzi, FRANCESCO, the son of a Florentine silversmith, was born in 1728 or 1730. His talent for designing was so great that he was put under teachers of painting, and then studied engraving with Wagner at Venice. After a first essay in this art at Rome he came to London in 1764, and for nearly forty years was busily engaged in producing engravings and mezzotints from the works of Cipriani, Angelica Kauffmann, and other artists, the copies often being superior to the originals. His *Clytie*, after A. Carracci, and his *Virgin and Child*, after Carlo Dolce, with the plates done for Boydell's Shakespeare, are among the best known

of his works. The market at present is flooded with feeble impressions from worn-out plates that do little justice to his merits. In 1802 he went to Lisbon to establish a school of engraving, and died there in 1815. He was the father of **Madame Vestris.**

Barton, BENJAMIN SMITH, born in Pennsylvania in 1766, and educated for the medical profession at Edinburgh and Göttingen, settled down to practise in Philadelphia. He subsequently held professorships of materia medica and clinical medicine in the college there, and was elected president of the American Philosophical Society. His numerous books and lectures gave a great impulse to the study of natural history in America. He died in 1815.

Barton, BERNARD, was born in London in 1784 of Quaker family, and began life in trade. On the death of his wife he went to Liverpool and spent his last forty years as a clerk in a bank, dying in 1849. During leisure moments he wrote a number of graceful and tender poems, evincing deep religious feeling and a genial appreciation of the beauties of nature. He attracted the notice and friendship of Charles Lamb and other writers, and before his death received a pension from Government. His chief works are *Napoleon, Devotional Verses, Poetic Vigils, The Widow's Tale,* and *The Reliquary.*

Barton, ELIZABETH, or "THE MAID OF KENT," was in 1525 a servant at an inn at Aldington in Kent. Her tendency to religious mania, probably originating in epilepsy, was made use of by the priests in opposing Henry VIII.'s plans for divorcing Catherine of Aragon. Under the sanction of Archbishop Warham, and with the approval of Fisher and Sir T. More, the wretched woman was worked upon by three monks, Masters, Bocking, and Deering, who put into her mouth prophecies of Henry's speedy downfall. The king for some time bore with the imposture, but at last was moved to resentment. Barton and four accomplices were brought to trial and executed at Tyburn in 1534.

Barton-on-Humber, a market-town of Lincolnshire, on the S. bank of the Humber, with a station on the Manchester, Sheffield, and Lincolnshire Railway, 6 miles from Hull. It possesses the churches of St. Peter, dating from the eleventh century, and St. Mary, founded in the fourteenth. Ropes, sacking, and bricks are made here, and there is some trade in corn and flour. Barton-on-Humber is called "Brereton" in Domesday, and described as having church, priest, two mills, a market, and a ferry. Pop. (1901), 5,671.

Barton-on-Irwell, a town in Lancashire, on the river Irwell, is about 6 miles from Manchester on the Liverpool Railway. There are factories for silk and cotton and extensive ironworks. The Roman Catholic church is a good specimen of Pugin's skill. Pop. (1901), 8,068.

Baruch, the son of Neriah, must have lived at the end of the seventh and beginning of the sixth centuries B.C. He acted as scribe to Jeremiah, recording and reading his prophecies of future disasters when Nebuchadnezzar had plundered the Temple. He accompanied Jeremiah into Egypt, and died either there or in Babylon. The book of Baruch found in our Apocrypha can hardly have been by him entirely, as it contains references to events and works of later date. Some of his materials may have been worked up by a Palestinian writer of the third century B.C. The Epistle of Jeremiah which forms the sixth chapter has no connection with Baruch, and was probably composed by a Hellenist of the Maccabean epoch.

Baryta. [BARIUM.]

Baryte, or BARYTES, is the natural sulphate of barium ($BaSO_4$), a common mineral, occurring commonly as a veinstone with metallic ores. It crystallises, often in large crystals, belonging to the prismatic system, and also occurs in stalactitic and other massive forms. It is colourless, white or yellow brown, so that the stalactites resemble fossil wood, but are recognisable by their weight. Its specific gravity is about 4·5, whence it was formerly confused with witherite, celestite and strontianite, under the name "heavy spar." It is translucent and vitreous, and has a white streak. It fuses with difficulty, decrepitating and colouring the flame yellowish-green. With sodium carbonate it sinks into charcoal or will stain silver black. The mineral is ground up and mixed with white lead as a paint.

Basalt, a dark-coloured lava, finely crystalline, compact or sometimes porphyritic in texture, composed essentially of a plagioclase felspar (labradorite or anorthite) and augite. Olivine, magnetite, apatite, and other minerals commonly occur in it as accessories, and there are varieties characterised by the more or less complete replacement of the felspar by nepheline or by leucite. The specific gravity of the rock ranging from 2·6 to 3·1, it belongs to the basic class of igneous rocks. It occurs in sheets, dykes and veins, and commonly exhibits columnar jointing produced by contraction during cooling. The columns are perpendicular to the surface of cooling, and may be three, four, six or eight-sided and of great length. There are also sometimes cross-joints parallel to the surface, and percolating water acting along all these joints produces spheroidal weathering. The surface of a basalt-flow is commonly covered with a thin glassy layer known as *tachylite.* Basalt is a hard, tough rock, suitable for road-metal. It surface weathers to a rust-brown. The "toadstone" of Derbyshire is an amygdaloidal basalt, and the columns of the Giant's Causeway in Antrim, and of Fingal's Cave, Staffa, are composed of an olivine-basalt. When coarse-grained, a basalt is termed *dolerite.*

Base, a chemical substance which has the power of reacting with an *acid* (q.v.) to form a compound differing in properties from both the acid and the base, called a *salt* (q.v.). Bases may be (1) metallic oxides, such as sodic oxide Na_2O, copper oxide CuO, etc.; (2) metallic hydroxides, *i.e.* compounds of a metal with hydrogen and oxygen, as sodium hydrate NaOH, etc.; or (3) ammonia and certain allied compounds. Many organic substances (ALKALOID) also exhibit basic properties. In the interaction of a base and acid water may or may not be formed, as examples in the following reactions:—

$$CuO + 2HCl = CuCl_2 + OH_2.$$
$$NaOH + HCl = NaCl + OH_2.$$
$$NH_3 + HCl = NH_4.Cl.$$

Bases are defined as mon-acid, di-acid, etc., according to the number of hydrogen atoms of the acid, which are displaced in the reaction with one molecule of the base. Thus the copper oxide is *di*-acid, the sodium hydroxide *mon*-acid.

Base Ball. This game corresponds in the United States to cricket in England. Every village, every school, every university in the country has its one or more clubs, and no paper is considered complete unless a base ball editor is on its staff. The game resembles cricket in that both require about the same area of level ground; both are played with a rather hard ball; both involve swift and accurate tossing and catching of the ball; both call for energetic fielding, and both are played with enthusiasm by young and old, rich and poor.

The game is an evolution, and is the only national sport in America that has not its counterpart in the mother country.

Amateur base ball is cultivated most successfully at the seats of learning, the matches between their clubs being watched with great interest, a position on a base ball "nine" being regarded in college as a distinction ranking with a seat in the "eight." Professional base ball, on the other hand, has been developed so far that it is a source of income to many clubs, who travel the country giving exhibitions of their skill in matches with rival organisations.

The game will be readily understood by a glance at the accompanying diagram.

Nine persons compose a side. In the centre of the field is a square with sides 90 feet long. This is called the diamond. The corners are known as home base (B), first base (D), second base (E), and third base (F). The side that is "out" takes position in the field; the catcher (A) just behind the home base; the pitcher (C) at a distance of 50 feet from the home base in line with the second base. Three basemen guard respectively the first, second, and third bases. A short stop is posted between E and F; and three fielders, known as right (H), centre (I), and left (J), take position at distances convenient for stopping balls sent beyond the diamond.

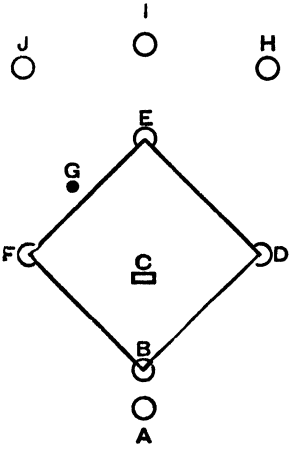


DIAGRAM OF A BASE-BALL FIELD.

A, Catcher; B, home base; C, pitcher; D, first base; E, second base; F, third base; G, short stop; H, right field; I, centre field; J, left field.

The nine men are now posted with the object of stopping any ball sent from the bat, and sending it to one of the bases before the batter himself can get there.

The pitcher (bowler) at C sends the ball over the home plate to the catcher at A. He does this with the greatest possible velocity, and with one of half-a-dozen "curves" that frequently deceives the batsman as to the distance the ball will be from him when passing. He is often tempted to strike at a ball that appears convenient, when in fact it is deflected so as to go above or below or beyond him by a twist of the pitcher's wrist, difficult to acquire, and still more difficult to understand. So many catchers have ruined their noses, teeth and fingers by the swiftness and unexpected movements of "twisted" balls, that they now generally wear steel masks, and leather protectors on their hands. When a ball merely "ticks" the bat it is frequently deflected with such force and rapidity that human activity cannot anticipate its movement. Many catchers stand close up under the bat of the opponent on the home plate (B) in order to be nearer the basemen. This involves some risk, as many a bat has fetched the catcher's head a blow that was intended for the ball.

The player at the bat, who is one of the "in" side, tries to strike the balls sent by the pitcher (C). If he knocks it into the air, and it is caught, he is "out," and the next of his side takes the bat. Should, however, the batsman send a ball back of the lines F B D, to the catcher's side of the diamond, it does not count, unless caught before striking the ground. Such a ball is called foul. If the batsman strikes, and the ball goes fair, and he is not "caught out," he runs to the first base (D), and is safe there, provided the fielders do not get the ball and pass it to the first baseman before the striker can get there. Supposing the first base is secured, the next man has gone to the bat, and as the balls are now passing between pitcher and catcher, the man "running his bases" tries to get to the second base (E), to the third base (F), and finally to the home base (B), thereby scoring a "run" for his side. If in running the "bases" he is touched by the ball in the hands of the "out side," while he is off the base, he is "put out," and his whole side is "out" when three men of it are "out." There upon sides are changed, and the party that has been in the field now comes to the bat for its "innings." Nine innings make a game, and the side that makes most runs in their innings has won.

The height of excitement is reached when the bases are all occupied by men running their bases, when two are already put "out;" when, therefore, the fate of four men hangs upon the success of the batsman's stroke; when, perhaps, it is the last innings, and the fate of the game depends upon getting not only the batsman's run, but the runs of the other three on bases. A brilliant "bat" between the lines of "fielders," or far beyond their anticipations, has at times redeemed disasters in the early part of the game, and made of a batsman the hero of the hour.

The bat is a straight round club of massive wood, tapering from the handle to the extremity, and about as long as a cricket bat. Its weight and

dimensions vary with the strength and taste of the player.

Basedow, JOHANN BERNARD, was born at Hamburg in 1723, and for several years of his early manhood was plunged in theological speculations to the loss of his repute for orthodoxy. He showed, however, real capacity for education, and in 1767 set seriously about the task of reforming the school system of Germany. A powerfully written appeal brought in subscriptions, and under the patronage of Prince Francis of Anhalt-Dessau he started the *Philanthropinon*, an institution that failed itself but served as a model to other schools. Basedow was afflicted with a temper that prevented his acting with others. He was engaged in educational experiments at Magdeburg, where he died in 1790.

Basedow's Disease. [GRAVES' DISEASE.]

Basel, BÂLE, or BASLE, the name of a canton and its capital in the N.W. of Switzerland. The former has an area of 184 square miles, and lies S. of the province of Alsace and the duchy of Baden. The southern portion is traversed by the Jura range with an average height of 4,000 to 5,000 feet, the slopes affording good pasturage. In the north the fertile lowlands are watered by the Rhine. Wine, corn, fruit, butter and cheese are the agricultural products, and timber is plentiful and valuable. Ribbon-making is an important industry, woollens, linens, and iron goods are also manufactured. The city division of the canton is quite distinct from the rural portion.

The town of Basel (anc. *Basilia*) stands on the S. bank of the Rhine, being connected with a suburb (Little Basel) on the other side by a fine bridge. Founded in the 4th century A.D. it became a free city of the empire in the 10th century. The noble Gothic cathedral was built on the site of a Roman structure in 1010, and contains the tomb of Erasmus and other interesting monuments. From 1431 to 1443 the famous Council of Basel was held here, in which the non-Italian bishops, aided by the Emperor and the King of France, tried in vain to impose checks on the papal power. In 1501 Basel joined the Swiss Confederacy, and the old Town Hall was built at this period. The citizens adopted eagerly the principles of the Reformation, but passed fortunately through that movement and the Thirty Years' war. The oppression of the rural inhabitants by the townspeople led to some disturbances until in 1832 the canton was divided. With railway communication on each side of the Rhine, and placed at the portal of Switzerland, Basel does a large transit business in goods and passengers. It manufactures silk, linen, and cotton, and has dye-works and iron foundries. It has always been an educational centre, and has a university, gymnasium, industrial school, library, botanical garden, and museum. Euler was born and taught here, and Holbein is supposed to have been a native of the place.

Basel Council, the last of the three great reforming councils of the fifteenth century, held its first session in Basel, Switzerland, in 1431.. It granted the use of the cup in the Lord's Supper to the Calixtines, the most powerful section of the HUSSITES (q.v.) in 1433, and endeavoured to limit the abuses of the papal prerogative. Pope Eugenius IV., who refused to cross the Alps to preside at it, soon opposed its action, and summoned it to meet at Ferrara. It refused, and on his summoning a rival council at Ferrara, suspended him (1438). Part of the council, however, then migrated to Ferrara, and afterwards to Florence. The majority, however, remained at Basel, and next year, after deposing Eugenius, elected Duke Amadeus of Savoy under the title of Felix V. He, however, was not generally recognised. The council (which had lost most of its Italian members on its suspension of the Pope) gradually dwindled, and in 1443 removed to Lausanne. In 1447 Eugenius IV. died, and in 1449 Felix resigned his claim to the papal office. The new Pope, Nicholas V., confirmed the acts of the council, which then submitted to him. Roman canonists deny the legality of its acts, but they were accepted as part of the canon law of France and Germany on the election of Felix, and are still partially in force.

Base-line, in *Surveying*, is a straight line very accurately measured on the tract of country to be surveyed. The position of this line having been fixed, other points may be plotted by simply observing the angles they subtend at each end of the base-line. Thus triangles are plotted, each of whose sides may in turn be regarded as a new base-line. In the Ordnance Survey of England and Wales the base-line was measured on Salisbury Plain, and was some miles in length. [TRIANGULATION, ORDNANCE SURVEY.]

Base-point. The base of an escutcheon is naturally the lower part of it, and the "base-point" proper is in the centre of the base directly above the point in which a shield of any shape terminates. The dexter and sinister base-points are on either side thereof.

Bashahr, a hill state of the Panjab, India, situated on the outskirts of the Himalayahs, and having an area of 3,320 square miles. It is traversed by the river Sutlej. The Rajah and higher classes are Rajputs, but the bulk of the population consists of Hindus. A small annual tribute is paid to the British Government, which exercises some control over the native ruler.

Bashan, a country to the N.E. of the valley of the Jordan in Syria. In the time of Abraham it was occupied by the Rephaim, the chief city being Ashteroth Kamaim. The Amorites were their successors, and Og, King of Bashan, was overthrown by the Israelites at Edrei, his kingdom going to the tribe of Manasseh. In the Psalms and Prophets the fertility of the region with its bulls, rams, goats, and fruit trees, is often referred to. It is last mentioned in 2 Kings x. 33. Later on it was divided into Gaulonitis, Trachonitis, Auranitis, and Batanea. After the death of Alexander its possession was frequently contested. The Arabian dynasty of the Gharsanides established themselves there. Trachonitis and the interior have been for many centuries more or less infested by freebooters,

and Hauran is still the seat of the Druses. The country is volcanic, and Jebel-el-Druz rises to a height of 6,000 feet. None of the architectural remains appear to be of great antiquity.

Bashi, or BASHEE ISLANDS, a group of the Philippines lying between Luzon and Formosa. They were discovered by Dampier in 1687, and colonised in 1783 by the Spaniards, to whom they still belong.

Bashi Bazouks (from Turkish words meaning disorderly dress), irregular Turkish troops, not in uniform, and usually Asiatics, sometimes recruited from the Circassians, who have emigrated in great numbers from the Caucasus of late years. They are daring when well led, but wild, and to all appearance quite undisciplined. Serious complaints were made of their behaviour in the Crimean war, and the Bulgarian atrocities of 1876 were largely ascribed to them.

Bashkirs (properly BASHKURDS), a Finnish people of East Russia between the Volga and the Ural rivers. During their long subjection to the Kapchak Tatars they became largely assimilated to the Tûrki type, and at present speak a Tûrki dialect. But their Finnish origin is betrayed by their red beards, and by the names Istaki (Ostiak) and Sari Ishtek (Red Ostiaks) applied to them by the surrounding Finnish peoples, the Ostiaks of the east Ural slopes being pure Finns. About the middle of the 19th century the Bashkirs were organised, like the Cossacks, as a frontier militia against the incursions of the nomad Kirghiz; but under Russian rule they have remained Mohammedans, and even partly still nomads. Total population over 500,000, of whom 360,000 are in Orenburg, the rest in the governments of Perm, Ufa, Viatka, and Samara.

Bashkirtseff, MARIE, was born in 1860, her parents being of good Russian family and apparently enjoying ample means. A delicate, intelligent, and precocious child, at the age of ten she accompanied her mother to Nice and other foreign places, and very soon afterwards began to record in a diary the impressions produced on her excitable mind by the events and the people that entered into her everyday life, noting with unsparing fidelity and remarkable literary skill all the aspirations, emotions, and passing phases of her highly strung and morbid nature. She devoted herself at first to music, with the idea that she might electrify the world as a great singer, but when the pulmonary affection, that was ultimately to prove fatal, impaired her voice, she took to painting with such success as to get her work admitted to the Salon. With occasional intermissions her journal was continued almost to the day of her death, on October 31st, 1884. The manuscript was entrusted to M. Theuriet with a view to publication, and after a delay of some six years was given to the world. No book in recent times has produced a more startling effect. The workings of a human soul had never been laid so bare since Rousseau wrote his *Confessions*, and the gravest divines and moralists found matter therein for reflection. Subsequent criticism suggests a doubt as to the complete sincerity of the author and the amount of editing which her pages have received; but in whatever proportions art and nature, fact and fiction may be blended, this so-called autobiography must be regarded as a deeply interesting literary production.

Basic Steel, a steel produced by a modified Bessemer process (q.v.), and having the advantage over the ordinary method that pig iron containing phosphorus may be employed for its manufacture. The important point of difference between the two methods is that the Basic-Bessemer converter is lined with a combination of hard-burnt magnesian limestone and anhydrous tar. This resists the extremely high temperature attained during the blowing, and effects the elimination of the phosphorus from the molten metal. The lining of the ordinary Bessemer converter is siliceous. [BESSEMER PROCESS.]

Basidiomycetes, a series of the higher fungi. They live on dead organic matter, and are made up of felted hyphal threads. No sexual process is known, and it has apparently been suppressed. [APOGAMY.] They bear spores, known as *basidiospores*, generally four together, at the apex of cells called *basidia*. These basidia form part of a layer known as the *hymenium*, which is either on the surface, as in the order *Hymenomycetes*, which includes the mushrooms, or lining the interior, as in the *Gasteromycetes*, the puff-balls. The gelatinous *Tremellini* form a third order in this series.

Basil, SAINT, THE GREAT, was born at Cæsarea about 330 A.D., and belonged to a distinguished family, his brothers Gregory of Nyssa, Peter of Sebaste, and Naucratius being famous in the annals of the Eastern Church. He at first devoted himself to forensic studies at Constantinople and Athens, but in 357 he was baptised and took to the most ascetic form of Christianity, travelling all over the East to learn the practices of the hermits. In 365 he was ordained at Cæsarea, and temporarily retiring into the wildest parts of Pontus, started the first monastic community in the East. In 370 he succeeded Eusebius as bishop of Cæsarea, and found himself severely pressed by the Emperor Valens to adopt Arianism, but he resisted even threats of death, and his firmness won for him respect and freedom from molestation till his death in 379. He left several works of interest, *e.g. Ascetica*, *De Spiritu Sancti*, his *Liturgy*, in which music received attention, and his correspondence with his life-long friend Gregory Nazianzen.

Other Basils attained eminence in the Church, as Basil, the first bishop of Ancyra, a semi-Aryan, 336–360; Basil, the mystic, who was burnt alive by Alexius Comnenus in 1118; and Basil of Thessalonica (Ascholius), the friend of St. Ambrose, who baptised Theodosius and died in 384.

Basil I. was born of humble stock near Adrianople in 813. He became a soldier, and going to Constantinople was noticed by the Emperor Michael, who promoted him ultimately to a share

in the throne, but finding him censorious resolved to kill him. Basil, however, turned the tables on him, put him to death, and reigned alone until 886.

Basil, a name applied to species of the genus *Ocimum*, a member of the order Labiatæ, natives of India, but grown in England as pot-herbs since the sixteenth century. In this genus the flowers are in verticillasters, forming an interrupted terminal raceme; the posterior sepal is large, rounded, and decurrent; the whole calyx deflexed after flowering; the corolla is short, its lower lip flat, and the four stamens are bent down on this lip. The chief species are *O. basilicum*, sweet or common basil; and *O. minimum*, bush basil.

Basilica (Greek *basiliké*, royal), originally a hall used for the sittings of the courts under the later Roman Republic and the Empire; the name has either reference to the existence of similar buildings under the Greek kings who succeeded Alexander the Great, or is derived from the official residence of the "Archon Basileus," who was judge in certain cases, at Athens. These halls were also used as business exchanges, and as promenades. After the adoption of Christianity the model they presented was followed in church building. Thus the nave, the aisles, the *narthex* or vestibule, and the apse are all features of the basilica at Pompeii; the latter representing the tribunal or part devoted to the judges. Twelve of the old churches of Rome are still called basilicas, that of the Lateran being the most famous, and the churches of St. Peter and of St. Paolo fuori le Mure in that city were originally of this type. Most of Sir Christopher Wren's churches are basilican in character.

Basilicata, now called Potenza, a province in the S. of Italy, with a coast-line on the Gulf of Taranto, and a smaller extent to the W. on the Gulf of Policastro. It is bounded by Calabria and Principato to the S. and W., and by Capitanata, Terra di Bari, and Otranto to the N. and E. It has an area of 4,120 square miles, and though it is generally mountainous, the valleys are fertile and produce wine, maize, linen, hemp, cotton, tobacco, and silk, being well watered by the Bradano, Basento, and other small rivers. Great numbers of sheep, goats, and swine are reared. Chief towns, Potenza, Melfi, Francavilla, Rionero, and Tursi.

Basilicon (Greek *royal*), a name given to a class of ointments containing yellow wax, resin, and olive oil, and other ingredients, used for burns, scalds, blistered surfaces, etc.

Basilides, a Syrian gnostic who flourished in Alexandria about 120 A.D., but of whose doctrines nothing is known save through the contradictory accounts of Irenæus and Hippolytus. He appears to have built up a system of abstract theology in which the God of the Jews occupied a very inferior position, being, according to the first account, antagonistic to the higher spiritualities, and, according to the second, subordinate to two loftier divinities. But in either case the Son—representing the Nous—was the revealer to mankind of truth and salvation.

Basilisk, any lizard of the genus Basiliscus, differing from the Iguanas in having no throat pouch or thigh pores, in the presence of a dilatable membranous sac on the top of the head, a continuous fin-like crest, capable of elevation or depression, along the back, and a similar one along the tail. They are lively, active animals, partly arboreal and partly aquatic, only resembling the mythic basilisk in their strange form, to which they owe their name. The Hooded Basilisk (*B. mitratus*) from Central America is about two feet long, inclusive of the tail, which is considerably longer than the body. The general hue is brown, marked with dark zigzag bands, and fading into white beneath. *B. amboinensis*, upwards of three feet long, found in the islands of the Indian Archipelago, is green, marked with white lines on the head, brown on the back and tail, and silvery white beneath.

The story of the mythic basilisk probably originated in some highly-coloured account of an African serpent (possibly *Naja haje*, *see* COBRA). Pliny describes it as "of the greatness of not more than three fingers, and remarkable for a white spot like a diadem on its head. It drives away all other serpents by its hiss[illegible] . . . It kills the shrubs, scorches up the green herb, and splits the rocks." It was believed that if speared by a horseman its poison passed through the weapon and killed the horse and its rider. But Lucan (*Pharsalia*, ix. 828) says that the horseman might escape death by promptly cutting off his right hand. Its blood was reputed efficacious against sorcery, and the only animal against which it was powerless was the weasel. Basilisks were said to be produced from the eggs of old cocks hatched under serpents or toads. In the middle ages the ideas of authors about the basilisk were modified somewhat, for Aldrovandus figures it as having an almost human head crowned, wattled, and with a recurved beak, a stout body, eight legs, and a snake-like tail. Specimens were exhibited "contrived out of the skins of thornbacks, skaits, and maids," and Sir Thomas Browne tells us that he "caused some to be thus contrived out of the same fishes."

Basim, or BASSIM, a town and district in Berar, British India, being part of the territory assigned by the Nizam, and governed by a commissioner.

Basin, a term commonly used in geology for a region in which the rocks are folded into a *centroclinal*, all dipping downwards towards a central depression, or into a *synclinal* in which they dip towards a line of depression. Our British coal-fields owe their preservation to such folds affecting the coal-measures, and such underlying rocks as the millstone grit, carboniferous limestone and old red sandstone, and artesian wells (q.v.) are rendered possible by similar folds, as in the Artois London, Paris, Southampton, and Vienna basins.

Basingstoke, a market town and municipal borough of Hampshire, 45½ miles from London on the South-Western Railway, and connected by canal with the Wey and Thames. The church of St. Michael dates from the sixteenth century. There is a considerable trade in corn, malt, and

agricultural produce. Basing House, two miles distant, was defended by the Marquis of Winchester against the Parliament until captured and destroyed by Cromwell in 1645. Pop. (1901), 9,793.

Basipodite, the name of one of the joints of the limbs of such higher crustacea as the crab; it is the joint nearest but one to the body.

Baskerville, JOHN, born in Worcestershire in 1706, began life as a writing-master in Birmingham, and taking to manufacturing made a fortune. In 1750 he turned printer and type-founder, producing some remarkably beautiful editions of the classics, which are the more valuable as the number was limited. He died in 1775.

Basking Shark (*Selache maxima*), the sole species of the genus, and the largest shark from the North Atlantic, a full-grown specimen being more than thirty feet long. These sharks are quite harmless unless attacked, and are taken on the west coast of Ireland for the oil extracted from the liver, a large fish yielding from a ton to a ton and a half. At certain seasons they are gregarious, and from their habit of lying motionless on the surface of the water their popular name is derived, as well as that of "sun-fish," by which they are known on some parts of the Irish and Welsh coasts. They are sometimes called "sail-fish," from their swimming slowly with the first dorsal fin out of the water.

Basle. [BASEL.]

Basnages, JACQUES, was born at Rouen in 1653, and educated for the Protestant ministry at Geneva, where he evinced great capacity for languages. He served as a pastor at Rouen till the Protestants were expelled, and settling then in Rotterdam exercised much influence in politics. Voltaire had a high opinion of his abilities. He became later on pastor at the Hague, and died in 1723. His works include a *History of the Reformed Churches*, a treatise on *Jewish Antiquities*, and a *Dissertation on Duels*.

Basommatophora, the sub-order of land and freshwater univalve shells (GASTROPODA) in which the eyes are situated at the base of the tentacles (STYLOMMATOPHORA); it includes the families *Auriculidæ* and *Limnæidæ* with *Limnæus* and *Planorbis*, the commonest of the English pond-snails.

Basque Provinces, THE (Spanish *Provincias Vascongadas*), a triangular district extending over 2,958 square miles in the north of Spain, and embracing the three provinces of Biscay, Guipuzcoa, and Alava. In race, language, habits, and political privileges the inhabitants differ considerably from the rest of the Spanish population. Their country, formerly constituting the kingdom of Guipuzcoa, is mountainous, picturesque, and wooded, with rich pastures, and fertile, well-cultivated valleys. It produces cereals, flax, timber, sheep, and cattle, and abounds in iron, tin, copper, marble, etc. The chief towns are Bilbao, St. Sebastian, and Vittoria. France has also a Basque element comprised within the arrondissements of Bayonne and Mauleon.

Basque Roads, an anchorage to the southward of La Rochelle, and between the Isle of Oléron and the mainland. Here, between April 11th and April 14th, 1809, Captain Lord Cochrane (afterwards Lord Dundonald), of the *Impérieuse*, with other captains—all under the nominal orders of Admiral Lord Gambier—destroyed with great gallantry, and amid great difficulties, a number of French men-of-war commanded by Vice-Admiral Allemand. The enemy's loss would have been very much larger had Lord Gambier permitted the operations to be continued in accordance with Lord Cochrane's plans.

Basques (ESKUALDUN), a people of the Western Pyrenees, still distinguished from their Spanish and French neighbours by their speech, which is the only non-Aryan language surviving in Western Europe. They are the *Vascones* of Latin writers; whence the terms Gascony, Biscay, and their present Spanish name, Vascongados. The Basques are supposed to be the direct descendants of the ancient Iberians, and the geographical nomenclature shows that their language was formerly current throughout the Iberian Peninsula and Aquitania. They still number about 120,000 in French, and 500,000 in Spanish territory (Labourd, La Soule, and Lower Navarra in France, Upper Navarra, Alava, Guipuzcoa, and Biscaya in Spain); but the type has been so completely assimilated to that of the surrounding Aryans that they would not be ethnically distinguished from ordinary South Europeans but for their language, which differs entirely from all other known forms of speech. This language is highly agglutinating, and even incorporating — that is, approaches in its structure both to the Georgian, Lesghian, and other Caucasian tongues, and to the polysynthetic languages of America, while differing totally from them in its vocabulary and phonetics. It is spoken in six marked dialects, that of Guipuzcoa being considered the softest and purest; but it is slowly yielding to the encroachments of French, and especially of Spanish, its use being officially prohibited in the schools, churches, and courts of justice throughout the Basque-speaking Spanish provinces. Hence, most of the rising generation are bilingual, speaking both Basque and Spanish in the south and Basque and French in the north. As a race the Basques are distinguished by a fine physique, well-proportioned figures, considerable intelligence, great energy and activity, with a singular aptitude for the most varied pursuits—navigation, agriculture, the civil and military professions.

Basrah, BASSORA, BALSORA, or BASSORAH (Arab. *Frontier*), a town in the pashalic of Bagdad, Turkey in Asia, on the west bank of the Shat-el-Arab, 70 miles from its mouth, was founded by the Caliph Omar in 636, and taken by the Turks in 1668. Its walls of sun-dried brick enclose within their circumference of 8 or 9 miles gardens, groves, and rice fields, irrigated by canals, as well as the bazaars and dwellings, several mosques, the governor's palace, and the English factory. Though ill-built and dirty, the place is a wealthy centre of trade by ship and caravan with the whole of the

East. Piece goods, muslins, silks, drugs, spices, indigo, coffee, dates, metals, pearls, horses, and every conceivable product pass through its marts. Arabs and Persians enter largely into the population.

Bas Relief (Fr. *bas*, low), or BASSO RILIEVO, a form of carving in which the figures project only slightly from their background. [*See* ALTO RILIEVO.] MEZZO RILIEVO (*half-relief*) is intermediate between these two.

Bass (Ital. *basso*, low), in music, the lower or grave part of the musical system, as distinguished from the higher or acute (treble) part. Practically middle C marks the division. The term is also applied to the lowest or deepest male voices. In this sense there are four kinds: the baryton, the basso cantante, the basso profondo, and the exceptionally deep contra basso, said to be peculiar to Russia. The Double Bass, or contra bass, is the deepest toned of stringed instruments.

Bass, BASSE, the popular name of any fish of the genus Labrax, of the family Percidæ [PERCH], distinguished from the true perches by the opercular bones being covered with scales, the spines on the operculum, and by the minute closely-set teeth on the tongue. They have two dorsal fins, the first with nine spines; the anal generally with three. Bass are common on the European and Atlantic coasts, and in the fresh waters of America. There are three European species, almost exclusively marine, of which the best known is *Labrax lupus*, the common bass, sea-dace, or white salmon—known to the Greeks by its generic, and to the Romans by its specific, name. It is generally from twelve to eighteen inches long, though much larger specimens are fairly common. In form it resembles the perch; upper parts dusky blue, passing into silvery white on the sides and belly, fins pale brown. It is an extremely voracious fish, and was formerly in high repute for the table, though now it is little esteemed. It is more abundant on the south coasts of England and Ireland than farther north, and ranges to France, Portugal, and the Mediterranean. *L. lineatus*, the rock-fish or striped bass of North America, closely resembles the common bass, but is somewhat larger, and marked by seven or eight longitudinal black lines on a silvery ground-tint. [WRECK-FISH.]

Bassano, a town in the province of Vicenza, Italy, on the river Brenta. It is well built, and surrounded by walls, one of the gates being the work of Palladio. Some good pictures exist in its 35 churches. Francesco, Giacomo, and other founders of the Venetian school were born here, and Bartolozzi and Volpato were trained in the school of engraving. Napoleon defeated Wurmser at this spot in 1796, and it conferred a dukedom on General Maret. Woollens, silk, and paper are manufactured, and the neighbourhood produces good wine and fruit.

Bassano, GIACOMO DA PONTE, born in 1510, taking his surname from his native place. Trained by his father and influenced by Titian, he became an admirable painter of landscapes with figures, historical subjects, etc., his works showing good draughtsmanship and fine colouring. Though he is said to have been prolific, few pictures of his are known to exist. The *Nativity* at Bassano is the finest. He died at Venice in 1592, and two of his sons distinguished themselves in the same art.

Bassaricyon, a genus of Procyonidæ, with two species (*B. gabbi*, from Costa Rica, and *B. alleni*, from Ecuador). In appearance they resemble the Kinkajou (q.v.), but the skull and teeth are very like those of the Raccoon (q.v.).

Bassaris, a genus of Procyonidæ, formerly placed with the Civets, with which their structure has little in common. The two species (*B. astuta*, from the south of the United States and Mexico, and *B. sumichrasti*, from Central America) are closely allied to the Raccoons, but of slenderer proportions and more elegant form. *B. astuta*, the caxomixle, is about a yard long, of which the tail is about two-fifths; the fur is brown, and the tail marked with rings. This animal is often kept as a pet by Californian and Mexican miners, and is said to be a good mouser.

Bassein, a port on an island 27 miles north of Bombay, British India. It is now of little importance, but in 1531 was one of the early Portuguese stations. Captured by the Mahrattas in 1750, it was ceded to the British in 1802 by the famous Treaty of Bassein.

Bassein, or BASSAIN, a district and its capital in Pegu, Farther India, under the chief commissioner for Burmah. The former has an area of 8,954 square miles, and a coast-line on the east of the Bay of Bengal. A mountain range stretches from N. to S. It is watered by the Irawadi, the delta of which produces heavy crops of rice. The town is on the Bassein river, a channel of the Irawadi, and does a considerable trade with England, to which it has belonged since 1852.

Basse-Terre, the capital and chief port of St. Kitts, British West Indies, situated on the west coast at the mouth of a river; it has a fortified harbour, and does a good trade.

Basse-Terre, the west island of Guadeloupe, French West Indies, and the capital of the colony which stands thereon. The town is diminishing in importance, having very bad anchorage.

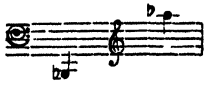
Basset Horn, a kind of tenor clarinet, with additional keys enabling it to reach the deep C (sounding F) in the bass clef. It has been made in various curved shapes for convenience of handling. Mozart and Mendelssohn, especially the former, have written for it.

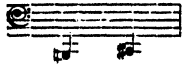
Basset Hound, a breed of dogs closely allied to the Dachshund (q.v.). They may be smooth- or rough-coated, and both these forms may have crooked or straight legs. These dogs are fairly common in France, where they are used to track game, but they were only introduced into England about 1875.

Bassompierre, FRANÇOIS DE, was born in Lorraine in 1579 of noble family. Entering the service of Henry IV. he distinguished himself by his ability, wit, courage, and gallantry. In 1622 he was made marshal, and subsequently went as ambassador to Spain, Switzerland, and England. He played a part in the siege of Rochelle. In the reign of Louis XIII. he opposed Richelieu, and consequently was imprisoned (1631) for twelve years in the Bastille, where he destroyed his thousands of love-letters and composed his highly interesting memoirs. He died in 1646.

Bassoon, a wood wind musical instrument of low pitch, whose sounds are produced through a double reed. It is doubtless of great antiquity, and has been known in one form or another for a long period under the names of buisine, buzaine, courtal, bommard, bombard, or wait. The primitive instrument is supposed to have been an improvement of the deep drone of the bagpipe (q.v.). One of the names for a pipe of deep tone among the Egyptians is *zummarah-be-soan,* according to E. W. Lane; and the spelling of the word in early times not only describes the character of the tone but also indicates its Eastern origin.

The improvement of the bassoon in its present form has been stated to be due to Afranio, a canon of Ferrara, in 1539. It is called *phagoti* by the inventor's nephew, who described the invention in a work published in the above-mentioned year. The name *fagotto,* by which the instrument is known in Italy, means a bundle or faggot, from a fancied idea that the bassoon resembled a bundle of sticks. The German term *fagott* is derived from the Italian. The French and Italians of modern times call it by the name Basson, from the sound produced. From the time of Afranio to the present the instrument has not varied much in its construction. The best are by French makers.

The compass of the bassoon extends to nearly three octaves, that is to say, from low B flat to treble A flat.

This compass includes all the intermediate semitones, except the lowest B natural and C sharp.



But these notes and others can be obtained from instruments of special construction.

The bassoon is used in the military reed band, as well as in the orchestra. In the latter it serves as the true bass of the oboe, but it is capable of excellent independent effects, such as appear in the *Pastoral Symphony* of Beethoven, the "Clown's March" in the *Midsummer Night's Dream* music of Mendelssohn, the scene of the resurrection of the nuns in Meyerbeer's *Roberto il Diavolo,* in Handel's *Saul,* Boieldieu's *Dame Blanche,* Gounod's *Faust,* and other works. It was said to have been introduced into the orchestra by Cambert in his *Pomone,* 1671, to augment the tone of the basses, but subsequent composers have exalted it into an instrument with individual powers.

BASSOON.

The double bassoon (It. *contra fagotto,* Fr. *contre basson,* Ger. *contra fagott* or *doppel fagott*) gives out sounds an octave lower than the ordinary bassoon. It was formerly employed in military bands, and appears to have been introduced by Handel in his concertos about the year 1739, when a pair of these instruments was made by Stanesby, and occasionally employed until the beginning of the nineteenth century. A newly-constructed instrument was employed at the Handel Festival at the Crystal Palace in 1871. Haydn, in his *Creation,* Beethoven, in many works, notably in the *C minor Symphony,* Mendelssohn, in his overture *The Hebrides,* and Sullivan, in several of his compositions, employ the double bassoon with great effect.

Bassora Gum, a tough white gum resembling *tragacanth,* and sometimes called *hog tragacanth;* specific gravity, 1·36. It contains a mucilaginous acid, called *bassorin,* closely allied to Arabic acid.

Bassorah. [BASRA.]

Bass Rock, a precipitous islet of basaltic formation, 350 feet high, at the mouth of the Firth of Forth, a mile from the coast of East Lothian. It was bought by Charles I. from the Lauder family, and used for some years as a prison for Covenanters. The adherents of James II. held it for some time against William III. It was then dismantled and passed into private hands, being of no value except for the eggs and feathers of sea-birds that swarm there in the breeding seasons.

Bass Strait, the strait which separates Van Diemen's Land or Tasmania from Australia, so named from the discoverer (1798), a surgeon in the British navy. Its breadth is 150 miles, and it contains a few islets rich in guano, and occupied by a small English colony.

Bast, or PHLOËM, the outer part of the fibro-vascular bundle in the higher (vascular) plants, consisting of tough thickened fibres (*hard bast*) and of sieve-tubes (the vessels of the bast) and cambiform tissue (*soft bast*). It is formed either directly from the procambial strand of cells, as in the closed bundles of leaves, and of the stems of monocotyledons, ferns, etc. (*primary bast*), or by the continued activity of the cambium, as in the open bundles of the exogenous stem (*secondary bast*). With the exception of cotton, all important vegetable textile substances are derived from this tissue, whether in the stem, as in hemp, flax, and linden, or in the leaf, as in Piassaba, Manilla hemp, New Zealand flax, etc. The name is popularly applied mostly to the inner bark of the linden, imported, in mats,

from Russia. Cuba bast is the product of the malvaceous *Paritium elatum*. *See* also RAFFIA.

Bastard. A bastard is a child not born in lawful wedlock, as distinguished from the legitimate offspring of married persons. The term "natural" is also applied to all children born out of wedlock.

By the English law a child born during the marriage of its parents is legitimate, even if the child be begotten before matrimony. The fact of birth *after* marriage is conclusive of legitimacy. In Scotland the subsequent marriage of the parents legitimatises *ipso facto* previous offspring.

An illegitimate child, or bastard, is regarded for most purposes as the son or daughter of nobody, and is therefore not heir-at-law to any of his reputed ancestors. He is entitled to no distributive share of the personal property of his parents if they die intestate; and under a will he cannot take under the general description of "son, daughter, or child," by which legitimate children alone are presumed to be designated. But he can take under a will made even before he was born, if *he is therein particularly described*. He may acquire property, and thus become the founder of a fresh inheritance, though none of his lineal descendants can claim through him the property of his reputed kin. If he dies without wife, issue, or will, his lands and goods eschent to the Crown or Lord of the Fee. In the former event it is usual for the Crown to resign its claim to the greater part of the property on the petition of some of his nearest quasi-kindred. There is a special clause in the Savings' Bank Act allowing the sum invested by a depositor (being illegitimate and dying intestate) to be paid to such person or persons as would be entitled to the same provided the depositor had been legitimate.

A bastard has no surname until he has acquired one by reputation, and in the meantime he is properly called by that of his mother; and she is, generally speaking, entitled to the custody of the child, notwithstanding that the putative father is able and willing to maintain it in better circumstances. The wishes of the child will, however, be consulted.

The putative father is liable to contribute to the support of his illegitimate child to an extent not exceeding 5s. per week, under what is known as an "affiliation order" (obtained from the magistrates, on proof of parentage), until the child arrives at the age of 13 years—or, at the discretion of the magistrates, 16 years—or obtains a settlement in its own right.

The rules of law as to bastardy have been hitherto mainly framed with reference to the Poor Law, for the purpose of saving the public (that is, the parish) from the charge of maintaining a bastard child. It is for this object the inquiries are instituted as to who has begotten the child and should contribute to its support; and for the purpose of settling disputes between parishes as to liability for its maintenance, it has long been decided that, for the purpose of settlement, a bastard shall be considered its mother's child. But the old rules of law as to the incapacities of bastards still subsist, and according to those rules a bastard has neither father, mother, sister, or brother, or other remoter kin. An English bastard is, therefore, the founder of a new stock: the creator of a family whose pedigree can never be traced beyond him, a distinction which other people cannot have.

The Roman law required children to be begotten in matrimony in order to be legitimate. The English law does not concern itself as to the conception, but only as to the birth, which must be in wedlock. The old Roman law required on the man's part in intercourse with a woman a "matrimonial mind." The English law does not care with what mind the intercourse is initiated; it is altogether indifferent about the origin of the connection. The old system combines with a clear practical rule for determining the father, an elevated notion of the dignity of the marriage connection. The English system lays down a clear rule for determining paternity, subject to which it is regardless as to the freedom of ante-nuptial sexual connection. The later Roman law gave a man the power of legitimatising his illegitimate child, which the English law does not.

In Scotland one important variation to the law of England has been noticed, viz. that the subsequent marriage of the parents legitimatises their children born before marriage. Another is that the mother has the legal custody of her illegitimate child only until the age of 10 years, the father being bound for maintenance up to that age, when he becomes entitled to the custody of the child.

Bastia, a fortified port on the E. coast of Corsica. It was founded in 1383 by the Genoese, and was taken by the French in 1553. Rising in an amphitheatre it is picturesque, but the streets are narrow and dirty. The harbour, commanded by the citadel, is difficult to enter, but does the largest trade of any in the island, exporting wine, oil, fruits, skins, and coral. Law courts, schools, hospitals, a theatre, and all the other institutions of a large French town are found here.

Bastiat, FREDERIC, the son of a Bayonne merchant, born in 1801, spent a few years in business, but retired early to a small country estate at Mugron, where he devoted himself to the study of economical questions. Between 1832 and 1844 he published several pamphlets on local subjects, but the Free Trade movement in England attracted his attention, and he at once adopted the doctrines of Cobden with zeal, writing his *Sophismes Économiques*, and *Cobden et La Ligue*, which stirred violently the minds of French thinkers. He started Free Trade associations in his country, and also a paper, the *Libre-Échange*. He was gaining ground when the revolution of 1848 brought him face to face with the opposing influences of socialism. Though hard work was affecting his health he issued a series of telling essays, in which he proved socialism to be tainted by the errors of protection, and in 1850 he brought out the first volume of a constructive treatise, *Les Harmonies Économiques*, intended to set forth his idea that human nature, if allowed free play, leads to harmonious combination of interests, and not to the

system of injustice and inequality that socialists would sweep away. But his malady compelled him to seek a change of climate in Italy, and he died at Rome at the end of the year.

Bastide, JULES, born in 1800 of respectable French family, attached himself early to the Liberal party, and assisted in carrying out the revolution of 1830. He then opposed himself to the Orleans dynasty, and for his share in the events of 1832 had to fly to England. Returning to Paris he began as a journalist to advocate Christian democracy. After 1848 he was for a time, conjointly with Lamartine, minister of foreign affairs, but at the December elections withdrew into private life, and occupied himself with writing on French history. He died in 1879.

Bastien-Lepage, JULES, was born at Damvillers in 1848, and soon abandoned his desk in a public office for the brush and palette. At the *Beaux Arts* he became a pupil of Cabanel, and was drawn towards the *Impressioniste* school. In 1873 he exhibited *Au Printemps* with marked success, which was repeated next year when he produced *La Chanson du Printemps* and *Portrait de mon Grand-père*. He now gained a rapid hold on the public taste, not only in France but in England, the main features of his work being minutely accurate drawing and rich effects of colour. *Jeanne d'Arc, Un Mendiant, Le Père Jacques, L'Amour du Village,* and *La Forge* are among his best known pictures, and one of the latest, a portrait of the Prince of Wales, was shown in the Grosvenor Gallery. His constitution broke down prematurely and he died in 1885.

Bastille (old French *bastir, bâtir,* to build), in mediæval France, a general term for a strong fortress, but the name was specially applied to the fortress in Paris at the Porte St. Antoine, built between 1370 and 1383, and afterwards used as a prison. The inmates were principally state prisoners, either awaiting trial or merely confined without trial during the king's pleasure, by *lettres de cachet,* often, in reality, for reasons of private enmity. At the outbreak of the French revolution on July 14th, 1789, it was stormed by the populace, assisted by some troops with field-pieces who had fraternised with them, and was destroyed next day. The event is now commemorated by a bronze column on its site, surmounted by a gilt statue of Memory spreading her wings as though to fly away, and inscribed with the names of 65 persons who took part in the assault, which may be regarded as the first event of the revolution.

Bastinado (Spanish *baston,* a stick), the European name for a beating, usually on the soles of the feet, sometimes on the back, which is a common form of punishment throughout the East.

Bastion (old French *bâstir,* to build), a projecting outwork of a fortress consisting of two flanks connected by two faces which meet at an acute angle (called the salient angle). Its object is to command all the ground immediately in front of the fortification, and bring artillery fire to bear on assailants. Detached bastions, introduced by Vauban, are separated from the work they protect by a ditch. [FORTIFICATION.]

Basutos, an eastern branch of the Bechuana race, from whom they were separated by the Boers moving from Cape Colony across the Orange river, about 1835. The Basutos have all been converted to Christianity by French Protestant missionaries, and at present form a flourishing civilised nation in Basutoland, which since 1884 has been a British Crown colony. Most of the arable land has been brought under cultivation, good roads opened in all directions, agricultural machinery introduced from England, schools founded in all the communes, and large sums voluntarily raised for educational purposes. During the war with the Transvaal (1899-1902) there was considerable anxiety as to the attitude which the Basutos would take up. In the Bechuana branch of the Bantu language the prefix *ba* answers to the Zulu-Kafir *ama,* as in Ama-Zulu, Ama-Xosa, etc.; hence Ba-Suto = the Suto (*paunched*) people; while the land is Le-Suto; the language Se-Suto; and the paramount chief, Mo-Suto. The language —which is rich, sonorous, and poetic—has been reduced to writing by the missionaries, and the natives themselves now freely use it in correspondence and a few local periodicals. Chief missionary stations: Maseru (the capital), Leribe, Cornet Spruit, Berea, Mafeking, and Quthing; schools, 177; attendance, 11,134; area of territory, 10,200 sq. miles; population (1904), 218,324.

Bat, the popular name for any individual of the order Chiroptera. Down to the end of the seventeenth century the zoological position of these animals was little understood; and so late as 1681 Grew, in the *Catalogue of the Museum of the Royal Society,* says that they stand "in the rear of beasts and in the front of birds," which added nothing to men's knowledge, for it was only a formal phrasing of the popular names "flittermouse," *i.e.* the flying or fluttering mouse, and "reremouse," from A.S. *hréremús*—the mouse that flaps (its wings). Two years after this Ray fully recognised their mammalian character; and Linnæus (1707-78) placed them in his chief order PRIMATES (q.v.), which also contained the lemurs, the apes, and man. Modern writers, however, do not admit the bats to such a high zoological rank, and they are now regarded as INSECTIVORA (q.v.), modified for flight, one of the surviving intermediate forms between the two orders being Galeopithecus, the FLYING LEMUR (q.v.).

The fore limbs are much longer than the hinder ones, and the digits of the former, with the exception of the pollex or thumb, are extremely elongated. The volar membranes (or those employed for flight) are three: (1) The ante-brachial membrane, extending from the shoulder to the base of the thumb; (2) the wing membrane stretched over the digits, carried along the side, and reaching to the feet; and (3) the interfemoral membranes, between the hind limbs. Well-developed clavicles are always present, and the radius cannot be rotated on the ulna. The bones though slender are not pneumatic.

Bats appear first in the Upper Eocene, and the oldest known fossil form is "very similar to existing European bats," so that the period of divergence of

the Chiroptera from the Insectivora must be very remote. The living forms are universally distributed over the tropical and temperate regions of both hemispheres, and fall into two natural groups or sub-orders.

I. MEGACHIROPTERA. Fruit-eating bats, generally of large size, limited to the tropical and sub-tropical parts of the Old World. The crowns of the molar teeth are marked with a longitudinal groove; index finger with three phalanges, the last phalanx generally armed with a claw; pyloric end of the stomach generally much elongated; tail, when present, inferior to, but not contained in, the interfemoral membrane. This sub-order consists of a single family, Pteropidæ. [FLYING FOX, FRUIT BAT.]

II. MICROCHIROPTERA. Bats ranging over the tropical and temperate regions of both hemispheres, living for the most part on insects, though some are fruit-eating, and two species are known to suck the blood of higher animals. [VAMPIRE-BAT.] They are much smaller than the bats of the first sub-order, and have the crowns of the molars with tubercles or cusps; generally one rudimentary phalanx in the index finger, which is never terminated by a claw; stomach simple; tail, when present, contained in the interfemoral membrane, or appearing on its upper surface. The sub-order is divided into two groups or alliances. [EMBALLONURINE ALLIANCE, VESPERTILIONINE ALLIANCE.]

Bats are small nocturnal or crepuscular mammals, furnished with true wings, and having the power of flight. They generally fly abroad in the morning and evening twilight, and retire during the day to caves or crevices in the rocks, or to the inner parts of the roofs of barns or churches, where they suspend themselves by means of the hooked claws on their thumbs. Their senses are intensely acute, as was proved by some interesting but cruel experiments of Spallanzani on various species, towards the close of the eighteenth century. Their eyes are small and bead-like, and the proverb "as blind as a bat" must refer to the dazed condition of these animals when suddenly exposed to a glare of light, and not to their normal state in fitting environment. Their ears are generally large and directed well forward, and they seem to have a special power of directing their flight in places so dark as to render the keenest vision useless. This power Cuvier thought was due to an exceptional development of the sense of touch in the volar membrane. His conclusion is now generally accepted; and later research shows that the wings of bats are very freely supplied with blood-vessels, and that these vessels have contractile walls, so that the circulation must be so active as to induce a condition closely akin to inflammation, and everyone who has suffered from a "gathering" knows how keenly inflammation heightens the sensibility of a part. The curious membranous appendages attached to the nose of many species doubtless serve the same purpose. [LEAF-NOSED BATS.] When not used for flight the wings of the bat are folded up by the long fingers being drawn together, and up towards the fore-arm, and the wing membrane then forms leathery folds at the sides of the body. In running or walking progress is effected by the action of the hind limbs and of the claws of the thumbs, which are placed on the ground. Doubtless it was from their appearance in this position that these animals derived their names of "flittermouse" and "reremouse." The teats, always two in number, are usually on the breast, sometimes on the sides. Some species are said to have them in the groin, but this is a mistake, for the nipple-like projections have been proved to be only warts. The reproductive organs in both sexes closely resemble those of the Primates (q.v.), a fact which influenced Linnæus in his classification. The majority of the species hibernate.

Batangas, a port of the island of Luzon in the Philippine group. It is a well-built town finely placed on a bay of the south coast, opening into the Strait of Mindoro, and commands a considerable trade.

Batani, a large Afghan tribe, the so-called "Jackals of the Vaziris," in the district extending from the east slope of Mount Gabr to the Hisâra Pass. Three main divisions: Tata (Pala), Dana, Uraspun, with about 40 khels altogether.

Batavi, a branch of a German tribe, the Chatti, who settled before the time of Julius Cæsar on an old island formed by the Old Rhine, the Waal, the Maas, and the ocean. From Augustus's time onward they were allies of the Romans, paying no taxes, but furnishing auxiliary troops. In Vitellius's reign, A.D 69, an unsuccessful rising took place among them, headed by Claudius Civilis. From them Holland takes its Latin name, Batavia.

Batavia, two townships in the United States bear this name—(1) the capital of Genesee Co., New York; (2) the capital of Claremont Co., Ohio.

Batavia, the classical name for the country between the Rhine and the Waal, known also as *Insula Batavorum*, and forming now all or the greater part of Holland.

Batavia, a port on the north coast of the island of Java, the capital of all Dutch territory in the Eastern Archipelago. It stands in a swampy plain at the head of a large bay, and is divided in two by the river Jacatra or Tjiliwong, which fills numerous canals intersecting the streets. The low-lying old town is extremely unhealthy, but the new quarter on higher ground affords a pleasant abode for Europeans and contains many fine buildings, including the government house, schools, hospitals, asylums, banks, etc. Several suburban villages extend beyond the town limits, and but small traces are left of the old ramparts. The harbour is not very good, as ships of much burthen cannot approach within a mile or two of the shore, but at Onrust, 6 miles distant, there is a large floating dock and facilities for making commercial basins. A railway has been made 40 miles inland, and tramways connect the different quarters. The population is very diversified, comprising Dutch, Javanese, Portuguese, Malays, Arabs, and Chinamen. Though Singapore is a powerful rival,

Batavia does an enormous trade collecting exports from all the islands of the Archipelago, and distributing to them imports from Europe, India, China, and elsewhere. The site was first occupied by the Javanese town of Sunda Colappa, then Jacatra took its place, and in 1619 the Dutch established their settlement. The British captured it in 1811, but restored it at the peace of Paris.

Batchian, or BATSHIAN, an island belonging to the Dutch in the Ternate group of the Molucca Archipelago. It has an area of about 900 sq. m., and is mountainous, but fertile, producing rice, sago, cocoa, and cloves. It was taken from the Spaniards in 1610. The capital, which has the same name, is in the interior.

Bateleur Eagle (*Helotarsus ecaudatus*), sometimes called the Short-tailed Eagle, from the north-eastern and southern parts of Africa. It is about two feet long, general colour on upper surface black, with greenish-metallic gloss, tail brownish red, and an ash-grey band on wings. The name *bateleur*, which is French, and means "a tumbler," was given to the bird by Le Vaillant from its habit of turning somersaults in the air.

Bateman, WILLIAM, a native of Norwich, who enjoyed a high reputation for knowledge of canon and civil law, and rose to be bishop of that diocese. Edward III. employed him in many embassies. He founded Trinity Hall, Cambridge, 1347, and died at Avignon, 1355.

Bath, a port in Maine, U.S.A., on the river Kennebec, 12 miles from the sea. Shipbuilding and fishing are the sources of a considerable prosperity. The place was incorporated as a city in 1850.

Bath, the chief town of Somersetshire, is situated on the river Avon and the Great Western Railway; 107 miles from London. Setting aside the mythical legend of King Bladud, it is first known in history in the 1st century A.D. as Aqua Solis, and numerous remains show that its mineral springs were familiar to the Romans. Offa founded an abbey here in 775, and Edgar was crowned in 973. The first charter was granted to the borough by Richard I., and it sent a member to Parliament in 1297. It was not, however, till the 18th century that the chalybeate waters, which have a natural temperature of 117° to 120° F., began to be appreciated so highly for gouty, rheumatic, and hepatic disorders, and the patronage of royal and aristocratic sufferers made the place a resort of fashion. Streets of fine houses, built of the local freestone, rose crescent-wise on the hill to the right of the river, which was spanned by noble bridges. In 1771 the Assembly Rooms were completed, and since then a number of public institutions have come into existence, including the Guildhall, Literary Institute, and Sydney Gardens, the hospital, etc. The springs are six in number, the King's being the oldest; and in the pump-room connected therewith "Beau Nash" from 1704 to 1750 reigned supreme over the fashionable throng that met to dance, flirt, gamble, and get rid of their ailments. The scene has been described by many novelists. When the Continent became more accessible the popularity of Bath declined except as a place of residence. It has recently shown symptoms of revival. The abbey church, dating from 1499, and restored by Scott, contains some interesting monuments. The grammar school was founded by Edward VI. The royal school for daughters of officers, the Bath college, and the Roman Catholic college are modern establishments. Pop. (1901), 49,817.

Bath gives its name to various articles:—BATH BRICK is composed of the fine silicious sand of the river Parrett in Somersetshire, which is made into bricks at Bridgewater for convenience of carriage, and used for cleaning knives, etc. BATH BUNS are larger and richer than the ordinary BUN (q.v.). BATH CHAPS are the cheek or *chop* of the pig, cured or smoked. BATH CHAIRS are small wheeled and hooded carriages used by invalids and others, usually drawn by a man, sometimes by a pony or donkey. BATH METAL is an alloy of copper and zinc, usually 55 parts of the former and 45 of the latter.

Bath, ORDER OF THE, or under its full title "The Most Honourable Order of the Bath," consists of two divisions, the military and the civil. The name undoubtedly originated from a certain portion of the ceremonies anciently attending the installation of each knight. The creations usually took place at the coronation of a king or queen, or at the creation of a prince or duke of the Royal family. The order can with certainty be traced back to the reign of King Henry IV., who on the day of his coronation conferred the honour upon forty-six esquires, who had, during all the previous night, watched in their armour in the chapel and bathed themselves. This occasion, according to many writers, was the institution of the order, but others are of opinion that the king herein simply revived the order. King Charles II. at his own coronation created sixty-eight knights, but the order was altogether neglected from that date until 1725, when it was revived and reconstituted by King George I. Since then it has undergone several alterations and modifications (civilians being admitted in 1847), and as at present constituted consists of three classes. The first class (exclusive of the sovereign and princes of the blood royal and such distinguished foreigners as may be nominated "Honorary" Knights) is to be limited for the military section to 50, and for the civil section to 25 Knights Grand Cross (G.C.B.). These have the privilege of using supporters with their armorial bearings. The second class consists of Knights Commanders (K.C.B.), who, after having been invested with the insignia of the order are entitled to the distinctive appellation of knighthood, and also take precedence of Knights Bachelors. The number is limited to 102 soldiers and 50 civilians. The third class are Companions (C.B.) only, and though they take precedence of esquires and wear the badge of the order are not entitled to the style or appellation of Knights Bachelors. The motto of the order, which appears upon all the stars and badges, otherwise varying for each class and for

military and civil distinction, is "Tria juncta in uno." The chapel of King Henry VII. in Westminster Abbey is the chapel of the order, where are to be seen the banners of the knights suspended over their stalls upon which are their plates of arms.

Bathometer, an instrument for the measurement of sea-depths. [SOUNDING.]

Bathori, STEPHEN, prince of Transylvania, was elected King of Poland in 1576, and governed the country wisely for ten years, having to contend against the encroachments of Ivan the Terrible, Czar of Russia. He died at Grodno in 1586. Many members of his family during the 16th century were engaged in the struggle between the Austrians and Turks on the Danubian frontier. His niece Elizabeth, a monster of cruelty, was reputed to take baths of human blood. She was convicted of murdering 650 girls or women, and was imprisoned in the fortress of Esej, where she died in 1614.

Bathos (Gk. *bathos*, depth, opposed to *hypsos*, sublimity), the effect produced in poetry or rhetoric by a sudden transition from the sublime to the commonplace, which is called anti-climax.

Baths, in health and disease. The beneficial action of the bath upon the human body in health is primarily attributable to its perfecting the action of the skin as an excretory organ, while secondarily important effects are produced through the cutaneous capillaries upon the distribution of the blood throughout the body.

The desirability of keeping the skin scrupulously clean is of course obvious; the superficial layers of the epidermis are in continual process of renewal; the degenerate surface scales become loosened, and unless they are removed they form an obstruction to further desquamation, prevent the escape of the excretion of the sweat-glands, and constitute a layer of decomposing organic matter upon the body surface. It is not the degenerate cuticle alone which cleanliness removes from the epidermis; the sweat glands are continually exuding excretory matter, and though the main function of these glands is to remove water from the body, whether in the form of beads of sweat or of "insensible perspiration," a certain though small amount of waste solid material also accumulates on the skin, unless removed by frequent ablutions. Hence the paramount importance of "keeping the pores of the skin open," as popular phraseology has it.

But, further, the skin, richly supplied as it is with blood-vessels, plays a most important part in regulating the body temperature. When the capillaries of the skin dilate, an increased amount of blood is exposed to the temperature at the outer surface, and when, on the other hand, they contract, the blood, driven from the cutaneous circulation, must accumulate in increased quantity in the internal organs. Immersion in cold water causes marked contraction of the small vessels of the skin, and this initial effect is followed by their relaxation and the consequent glow of warmth, which is familiarly known as the "reaction," after cold bathing. These variations in the calibre of the small cutaneous arterioles are due to the contraction and relaxation of the muscular fibres in their walls, and cold baths "educate," so to speak, these muscular fibres to a ready response to alterations in the temperature of the media surrounding the body. If, on the other hand, these muscular fibres act sluggishly, the organism is liable to suffer from sudden changes in the external temperature, and chills are apt to result.

The reaction produced as an after effect of the cold bath, moreover, increases tissue changes in internal organs, promotes nutrition, and has a distinctly tonic influence.

If the body is exposed too long to the action of cold water a spasmodic contraction of the muscular fibres is induced, no healthy reaction follows, and the vessels of the skin, instead of being trained to beneficial action, are subjected to a paralysing influence which may be productive of ill effect. It is open to question whether in civilised communities more harm is worked by defect or by excess of zeal in the matter of cold bathing. Certainly not a little mischief results in debilitated subjects from over enthusiasm in this particular, and it is, unfortunately, a common practice, especially with young boys, to protract the stay in cold water beyond reasonable limits. It may be laid down as a rule that cold bathing should never be indulged in for so long a period as to prevent the supervention of the natural "reaction." The applications of baths in disease may be spoken of under the following heads:—

1. The *cold bath*, apart from its tonic influence (mainly of use in healthy persons), is a valuable agent for effecting a reduction of temperature in fevers. In fact, immersion in cold water is the safest and surest means at disposal in the treatment of hyperpyrexia. Cold sponging is a less severe measure than actual plunging into water, and is largely employed in the treatment of febrile patients. The cold pack is another modification of the same idea: a sheet is steeped in cold water, wrung out, and wrapped round the patient, who is then enveloped in blankets. After a while profuse perspiration is usually induced. The mechanical restraint which is here combined with the application of cold commends itself in the treatment of some delirious patients, who not unfrequently pass after "packing" from a condition of great restlessness into a quiet sleep. Among methods of applying cold water locally the various forms of douche, in particular the "spinal douche," and the sitz bath, may be mentioned.

2. *Hot baths*, in which the temperature of the water is that of blood heat (98·6° F.) and upwards, are employed to produce sweating. Care must be taken that the patient does not become chilly after removal from the water.

3. *Air baths.* The "lamp-bath" is a familiar form of air bath. The subject is seated naked on a cushioned chair with a lamp beneath him, and enveloped in blankets. Some drugs, particularly calomel, are administered by fumigation, as it is called, the patient being placed in a lamp bath, and a little calomel converted into vapour, the fumes being confined within the blankets until the patient

has been subjected to their influence for a sufficiently long time.

The Turkish bath is a more elaborate species of hot air bath; there are two or three rooms filled with hot air ranging between 120° and 200° F., or even higher in temperature. Rheumatic and gouty patients doubtless derive some benefit from Turkish baths; the great objection to them is that it is necessary to consume a great deal of time in going through the various processes.

4. *Vapour baths.* Here steam, not hot air, is caused to envelope the patient. They form a valuable remedial agent in cases of dropsy, but have to be used with caution.

It only remains to add that while in suitable cases the various medicinal baths are of considerable use, their power for good is apt to be exaggerated, and mistaken enthusiasm concerning them leads to much useless expenditure of time and energy.

Bath-stone, a building stone obtained from quarries in the lower oolite near Bath and Box in Somersetshire, and also in Wiltshire. It contains about 94½ per cent. of carbonate of lime, and 2½ per cent. of carbonate of magnesium, cuts very easily in the quarry, and hardens in the air, but is by no means durable when exposed to the weather.

Bathurst, a British settlement on St. Mary's Island, at the mouth of the Gambia river, West Africa. It exports palm-oil, ivory, gold-dust, wax, teak, and other African products, and the inhabitants are chiefly blacks. A town of the same name is in Cape Colony, 20 miles S.E. of Graham Town.

Bathurst, a district of Upper Canada, on the right bank of the Ottawa river, with an area of 1,700 square miles. It is an important agricultural centre, and has rapidly grown in population. There are also in North America—Bathurst Land, lat. 75° N., long. 100° W.; Cape Bathurst, lat. 70° 30′ N., long. 127° 30′ W.; Bathurst Inlet, lat. 67° 30′ N., long. 109° W.; and Bathurst Lake, in the centre of Newfoundland.

Bathurst, the chief town of the western portion of New South Wales, situated on the Macquarie river, 122 miles S.W. of Sydney, with which it is connected by rail. Since its foundation in 1815 it has grown very steadily, owing to the richness of the soil, which is admirably suited to cereals; but the discovery of gold at Ophir, 27 miles distant, gave a great impulse to its prosperity, and in 1862 it was made a municipality. It possesses well-built streets and public buildings, is the seat of an Anglian and Roman Catholic bishopric, and contains tanneries, soap-works, and other factories. Diamonds and other precious stones are found in the neighbourhood.

Bathurst Island lies 120 miles W. of Port Essington, North Australia, and is of triangular shape, measuring about 30 miles from angle to angle; is densely wooded, except towards the west.

Bathybius. When alcohol is added to sea-water the sulphate of lime in the latter is deposited as a gelatinous mass or precipitate; some of this, containing minute organic calcareous bodies (coccospheres, etc.), when first found was described as an organism. It was supposed to cover great areas of the deep ocean floors with masses of protoplasmic slime.

Bathycrinus, one of the best known of the living genera of Crinoidea or sea lilies. *B. gracilis* is common in the deepest parts of the Bay of Biscay.

Batiste, a kind of fine Cambric (q.v.); the name is said to be derived from that of its original maker, Baptiste of Cambrai.

Batley, a town in the West Riding of Yorkshire, 2 miles from Dewsbury, on the London and North-Western and Great Northern railways. Shoddy-cloth, carpets, and heavy woollen textures are largely manufactured here. Pop. (1901), 30,321.

Batn-el-Hajar, or BATAN-EL-HAJAR, a tract of the Nubian desert stretching on each side of the Nile, S. of Wady Halfa, between 21° and 22° N. lat.

Batoka (*Batonga*), a numerous Bantu nation of the Middle Zambesi, mainly between the Victoria Falls and the Kafukwe confluence, where they are conterminous with the Banyai; outlying sections reach as far E. as Tete on the Lower Zambesi, while another branch migrated many generations ago southwards to the district now known as Tongaland, between Delagoa Bay and Zululand. The Batokas are a mild, inoffensive, agricultural people, by whom the missionaries Moffat and Livingstone were well received, and who also welcomed the officials of the British South Africa Chartered Company in 1890–91.

Baton, a short staff or truncheon given and carried by field marshals and other high officers as a token of authority. Two of these placed in saltire behind the arms are borne by the Duke of Norfolk, Hereditary Earl Marshal of England; and two slightly different in shape are likewise borne behind the arms of the family of Keith, Earl Marischal of Scotland.

Baton-Rouge, a town in the State of Louisiana, U.S.A., on the left bank of the Mississippi, 120 miles above New Orleans. It was one of the earliest French settlements, and has only within recent years given place to New Orleans for a time (1862–1880) as capital of the State. It possesses a university and many public buildings. Captured by the Federals in the Civil war, it was defended by Williams against the Confederates under Breckenridge in 1862.

Baton-sinister, BATON, BASTON, BATTON, BATTOON, BATUNE, and FISSURE are all names used to denote one of the recognised marks of illegitimacy. It is placed in bend sinister, is one-fourth of the width of a bend, and does not extend to the sides of the shield. It will be found occurring both charged and plain, and since the 17th century it has been exclusively reserved to difference the arms of illegitimate descendants of the royal family only.

Batoum, a port on the Black Sea, 110 miles N.E. of Trebizond. It was ceded to Russia by the Turks after the war of 1878. The town is dirty and unhealthy, but has somewhat improved under its new master, and the harbour, which is the best on that coast, now serves for the export of vast quantities of mineral oil from the district between the Black Sea and the Caspian. The neighbourhood produces many cattle and excellent fruit.

Batrachia, a term used in two senses: (1) As the equivalent of the modern Amphibia (q.v.); (2) as a synonym of Anura or tail-less Amphibia.

Batrachomyomachia, a mock heroic epic sometimes ascribed to Homer, but attributed by Suidas and Plutarch to Pigres of Caria, the son or brother of Artemisia, the famous queen of that country and ally of Xerxes, and if they are correct, dating from the first half of the fifth century B.C. It describes in epic verse a battle (Gr. *machē*) between frogs (Gr. *batrachi*), and mice (Gr. *myes*), and is probably the earliest parody now extant.

Batta (perhaps from Canarese *bhatta*, paddy, or rice in the husk) an allowance made to British officers in India in addition to their ordinary pay, and varying according to the station of the troops, and according also as they are in garrison or in the field.

Batta (plural *Battak*), a large non-Malay nation of North Sumatra belonging to the same widespread Indonesian stock as the Lampongs of South Sumatra, the neighbouring Mentawey islanders, the Bornean Dyaks and the Bisayas of the Philippines. Like all Indonesians they approach the Caucasic (European) type in their regular features, large straight eyes, full beard, and relatively light complexion. Like them also they speak a Malayo-Polynesian dialect, which betrays Hindu influences both in the presence of numerous Sanskrit and Pali words, and in the use of an alphabet derived from the Dewanagari of the Asoka inscriptions. Their chiefs also bear the Indian title of *raja*, and the name Batta applied to them by the Malays appears to be the Sanskrit *Bhatá*, "wild" or "barbarous." This name, unknown to the people themselves, is still justified by their savage customs and cannibal practices, which they have preserved under an outer varnish of Hindu culture. Human flesh, however, which is always eaten raw, is now reserved for special occasions, and is chiefly supplied, not by raiding, as formerly, but by their own criminals condemned to death. The Batta territory extends from the equator to about lat. 3° N., but nowhere reaches the sea, all the coast lands being held by peoples of Malay race. Akin to the Battak are the Orang-Lubu, Orang-Kubu, Orang-Abung and others scattered over the interior of Central Sumatra.

Battalion. [ARMY.]

Battens (a mis-spelling of the French *bâton*), small strips of firwood, used either as cross pieces to keep boards placed side by side together or to fasten tiles and slates, or nailed over the edge of a ship's hatchway so as to fasten a tarpaulin over it and prevent water leaking in when seas are shipped (in which case the hatches are said to be "battened down"), or for other purposes.

Battering-ram, an ancient military engine, consisting of a large beam, often the trunk of a tree, terminated by a mass of metal shaped like a ram's head. It was used to make breaches in the walls of a besieged town, and first became an important instrument under the Macedonian power in Greece. At first worked only by hand, it was afterwards mounted on wheels, and later on hung between posts and swung to and fro by men, who were protected from the defenders' missiles by a sort of wooden shed erected over them. The beam was then at times from 80 to 120 feet long, so that it could be placed across a ditch. The Romans used such rams against Syracuse in the Second Punic war, and often afterwards, especially at the siege of Jerusalem.

Battersea, a suburban parish and township in the county of Surrey, 4 miles S.W. of London, lying S. of the Thames, and opposite to Chelsea. It comprises 2,343 acres, and returns a member to Parliament. In the early part of the 19th century much of the district was open country, and in 1829 the Duke of Wellington fought his memorable duel with the Earl of Winchilsea in Battersea Fields. The market gardener for some years clung to the soil, but had to give way to the speculative builder, and only here and there are traces left of rural simplicity. The Church of St. Mary, rebuilt in the abominable taste of the close of the 18th century, contains an interesting monument to Lord Bolingbroke, and others of the St. John family, whilst the east window was the gift of Anne Boleyn's father. The Grammar School has been remodelled on modern lines. Battersea Park, 185 acres in extent, with a sub-tropical garden of four acres, was opened in 1858, and is connected with the Middlesex side by the handsome new Chelsea bridge. Pop. (1901), 168,896.

Battery. [ASSAULT.]

Battery, in the British army, the term for the smallest independent unit of an artillery force. In the siege artillery of foreign armies this is called a company. A field battery has six guns in all modern armies except the Russian, in which it has eight; a mountain battery consists of four seven-pounder guns carried on the backs of mules. *Siege batteries* are groups of guns protected by a bank of earth in front, and provided with platforms, magazines, etc., so that the guns may be conveniently worked.

Battery, in *Electricity*, is a cell or combination of cells, composed of such constituents and arranged in such a way as will give us an electric current when a conductor is made to join its terminals. The energy required to effect this is supplied by the constituents of the battery, which have a chemical affinity for each other, and by their reaction to produce chemical compounds set free a surplus of energy. If this reaction takes place

when there is no complete electric circuit, the surplus energy appears as heat; if, however, the circuit is complete, or *closed*, this energy is directed to drive electricity through the circuit. A battery is the more effective if it can send a greater current through the same resistances. [RESISTANCE.] It is then said to possess a greater electro-motive force (q.v.), for brevity generally termed E.M.F.

Batteries are of two kinds, *primary* and *secondary*. In the primary battery we choose materials that are readily obtainable in the required condition to react on one another. Thus, in the simple Volta cell we have a stick of zinc dipping into a vessel containing dilute sulphuric acid. Zinc has an affinity for sulphuric acid, and *when impure* will readily dissolve therein without the use of a separate piece of other metal. If pure the zinc will not dissolve unless a conducting circuit be formed. This is effected by placing a stick of copper in the liquid, and by joining the two metals outside the cell with wire or some other conductor. In this case, as soon as the circuit is closed the zinc stick begins to waste away, zinc sulphate is formed in the acid solution, and hydrogen bubbles appear on the copper stick that dips into the liquid; moreover, the circuit acquires properties that we understand to be due to the flow of an electric current through it. The E.M.F. of the battery depends on the substances used, and may be approximately calculated with a knowledge of the energy with which the two poles become oxidised. It is conventional to regard the current as flowing from copper to zinc in the outside circuit, which is the direction of the apparent passage of the hydrogen through the liquid. Descriptions of the more important batteries are given separately. Grove's cell is useful for its high E.M.F., about 1·9 volts [VOLT], its fair constancy and low resistance; Leclanché's for its applicability to intermittent easy duty; and Latimer Clark's Standard cell for its constancy. The deposition of hydrogen on the copper pole diminishes the efficacy of the battery by setting up a counter E.M.F. The means adopted to remedy this are discussed under POLARISATION, as this deposition is termed.

Secondary batteries do not differ intrinsically from primary batteries. They are simply brought to the condition of being able to drive a current in one direction by the previous passage of a suitable current in the reverse direction. This effects certain changes in the materials of the battery at the expense of electrical energy; which, however, is recovered when the battery reproduces an electric current. A secondary battery may therefore be regarded as an arrangement for the convenient storage of electrical energy, which may be taken out when desired. It is extremely important practically, on account of its high E.M.F., its very low resistance, and its portability. [ELECTRICITY, ELECTRIC LIGHTING, RESISTANCE, PLANCHÉ CELL.]

Battery, FLOATING. A floating fort, designed especially for the purpose of attacking land defences and only secondarily as a mobile man-of-war. Floating batteries were first used on a large scale by the Spaniards during their grand attack on Gibraltar in 1782. On that occasion ten elaborately contrived batteries were used, their sides being of immense thickness and solidity, and their upper decks covered with turf: but the British red hot shot burnt and blew up nine out of the ten, and the remaining one was boarded and set on fire. During the Russian war of 1854–56 the British Government built eight floating batteries, each carrying fourteen or sixteen guns, with a view to reducing the Sebastopol defences. These were plated with iron, and some were built of iron and some of wood. These were the first ironclads of the British navy, and were modelled after five somewhat similar vessels which were built in France for the same object, but all of wood. The speed of these vessels was inconsiderable, and in no case exceeded about six miles an hour. They were completed too late to be of much use during the war.

Batthyani, the name of a distinguished Hungarian family that has since the 15th century been closely connected with the varying fortunes of the Magyar kingdom. Louis Batthyani, Count of Nemeth Ujvar, was born in 1809 and served as a youth in the Austrian army. He then took to politics, and from 1839 to 1848 struggled bravely in the House of Peers against the attempt to crush out Hungarian nationality. Alarmed by the revolutionary movement the Emperor Ferdinand made sweeping concessions, and allowed Batthyani to form an independent ministry. At the same time he treacherously incited Jellachich, the Ban of Croatia, to invade the kingdom. The Croatians were defeated in spite of Austrian support, and Batthyani, eager to arrive at a peaceful solution, went, in October, 1849, to the headquarters of Prince Windishgratz to propose terms. He was seized, tried by court-martial, and shot.

Battle, a market town in Sussex, 8 miles N.W. of Hastings. It derives its name from the Battle of Senlac or Hastings, in which William of Normandy defeated and killed Harold on October 14, 1066. The remains of the abbey built by the Conqueror to celebrate his victory are no longer in existence, the ruins adjoining the seat of the Duke of Cleveland belonging to a later period. The old church has some good glass and several interesting monuments. There are large gunpowder-mills in the neighbourhood. Pop. (1901), 2,996.

Battle-axe, a heavy, powerful axe, usually with an iron handle and a broad steel head, much used in warfare by the ancient Keltic and Norse peoples, and in mediæval times, particularly in sorties, both by cavalry and foot-soldiers. That used by the latter was the heaviest, and was grasped by both hands.

Battlement, a parapet usually surmounting a building, pierced with *crenelles* or embrasures, and designed to afford protection to marksmen who were sheltered behind the *merlons* or portions of wall between the embrasures. Originally introduced into castles, it soon was adopted in churches and other buildings for ornamental purposes.

Battles. The chief battles of the British Navy are the following :—

1340. June 24.—Sluys. Edward III. defeated the French.
1350. Aug. 29.—Winchelsea. Edward III. defeated the Spaniards.
1372. June 22.—Rochelle. The Earl of Pembroke was defeated by the Spaniards.
1387. March 24.—The Channel. The Earl of Arundel was defeated by the Flamands.
1416. Aug. 15.—Harfleur. The Duke of Bedford defeated the Franco-Genoese squadron.
1512. Aug. 10.—Brest. Drawn battle between the English and French.
1513. Apr. 25.—Brest. Drawn battle between the English and French.
1545. June 18, 19.—Spithead. Drawn battle between the English and French.
1588. July 19-28.—The Earl of Nottingham defeated the Spaniards.
1596. June 20.—The Earl of Nottingham captured Cadiz.
1652. May 19.—Dover. Blake defeated Tromp.
1652. June 12.—The English engaged the Dutch off the Lizard.
1652. July 4.—The Channel. Ayscue defeated the French.
1652. Aug. 16.—Plymouth. Ayscue defeated De Ruyter.
1652. Aug. 27.—The Dutch defeated the English off Elba.
1652. Sept. 28.—The Goodwins. Blake defeated De Witt.
1652. Nov. 29.—The Ness. Blake defeated by Tromp.
1653. Feb. 18-20.—Off Portland. Blake defeated Tromp.
1653. June 2, 3.—The Gable. Monk defeated Tromp.
1653. July 31.—Defeat and death of Tromp.
1655. Apr. 4.—Blake bombarded Tunis.
1657. April 20.—Blake bombarded Santa Cruz.
1665. June 1-3.—Lowestoft. The Duke of York defeated Opdam.
1666. June 1-4.—The Goodwins. Drawn battle between Monk and De Ruyter.
1666. July 25.—North Foreland. Monk defeated De Ruyter.
1667. May 10. — Sir Christopher Harman defeated the French and Dutch.
1667. June 11, 14.—The Dutch in the Medway.
1672. May 8.—Solebay. Indecisive battle between the English and French and the Dutch.
1673. May 28. — The Channel. Prince Rupert repulsed Tromp.
1673. June 4. — The Channel. Prince Rupert repulsed Tromp.
1678. Aug. 11.—Drawn battle between the English and French and the Dutch.
1689. May 1.—Bantry Bay. Drawn battle between Herbert and Châteaurenault.
1690. June 30.—Beachy Head. Drawn battle between the English and Dutch and the French.
1692. May 19-24.—La Hogue. Russell defeated De Tourville.
1693. June 17. — Lagos Bay. Rooke defeated by the French.
1702. Aug. 20-24.—Off Santa Martha. Drawn battle between Benbow and Du Casse.
1702. Oct. 12.—Vigo. Rooke defeated the Franco-Spanish squadron.
1704. Aug. 13.—Malaga. Rooke defeated the Comte de Toulouse.
1708. May 28.—Carthagena. Wager defeated the Spanish.
1718. Aug. 11.—Cape Passaro. Byng defeated the Spanish.
1739. Nov. 21.—Vernon captured Porto Bello.
1744. Feb. 11.—Toulon. Drawn battle between the English and the Franco-Spanish.
1747. May 3.—Finisterre. Anson defeated De la Jonquière.
1747. Oct. 14.—Finisterre. Hawke defeated De Letendeur.
1748. Oct. 1.—Havana. Knowles defeated the Spanish.
1756. May 20.—Minorca. Indecisive action between Byng and La Galissonnière.
1758. April 29.—Negapatam. Indecisive action between Pocock and d'Aché.
1758. Aug. 3.—Pocock engaged d'Aché in the East Indies.
1759. Aug. 18-19.—Barbary. Boscawen defeated De la Clue.
1759. Sept. 10.—Ceylon. Indecisive action between Pocock and d'Aché.
1759. Nov. 20.—Belle Isle. Hawke defeated Conflans.
1778. July 27.—Brest. Indecisive action between Keppel and d'Orvilliers.
1779. July 6.—Grenada. Byron defeated d'Estaing.
1780. Jan. 16.—Cape St. Vincent. Rodney defeated De Langara.
1780. April 17. — Martinique. Indecisive action between Rodney and De Guichen.
1780. May 19.—Rodney engaged De Guichen in the West Indies.
1781. April 29.—Martinique. Indecisive action between Hood and De Grasse.
1781. Aug. 5.—Dogger Bank. Hyde Parker defeated Zoutman.
1781. Sept. 5.—Lynn Haven. Indecisive action between Graves and De Grasse.
1782. Jan. 25, etc.—St. Christopher. Indecisive actions between Hood and De Grasse.
1782. Feb. 17.—Pondicherry. Indecisive action between Hughes and De Suffren.
1782. April 12.—Ceylon. Indecisive action between Hughes and De Suffren.
1782. April 12.—Martinique. Rodney defeated De Grasse.
1782. July 5. — Negapatam. Indecisive action between Hughes and De Suffren.
1782. Sept. 3. — Trincomalee. Indecisive action between Hughes and De Suffren.
1783. June 20. — Cuddalore. Indecisive action between Hughes and De Suffren.
1794. May 28—June 1.—Bay of Biscay. Howe defeated Villaret-Joyeuse.
1795. March 13, 14.—Genoa. Hotham defeated Martin.
1795. June 17.—Bay of Biscay. Cornwallis engaged and eluded a superior force under Villaret-Joyeuse.
1795. June 23.—Belle Isle. Bridport defeated Villaret-Joyeuse.
1795. July 12. — Hyères. Unsatisfactory action between Hotham and the French.
1797. Feb. 14.—Cape St. Vincent. Jervis and Nelson defeated the Spanish.
1797. July 22, 24.—Santa Cruz. Nelson repulsed by the Spanish.
1797. Oct. 11.—Camperdown. Duncan defeated De Winter.
1798. Aug. 1—Aboukir Bay. Nelson defeated Brueys.
1798. Oct. 12.—Donegal Bay. Warren defeated Bompart.
1801. April 2.—Copenhagen. Nelson destroyed the Danish fleet.
1801. July 12.—Cabareta Point. Saumarez defeated Moreno and Linois.
1805. July 22. — Ferrol. Calder defeated Villeneuve and Gravina.
1805. Oct. 21.—Trafalgar. Nelson defeated Villeneuve and Gravina.
1805. Nov. 4.—Strachan's victory off Cape Ortegal.
1806. Feb. 6.—San Domingo. Duckworth defeated Leissegues.
1806. Sept. 25.—Rochefort. Hood defeated the French.
1807. Feb. 19.—Dardanelles. Duckworth forced the passage.
1807. Aug. 12—Oct. 21.—Gambier took Copenhagen and the Danish fleet.
1809. April 11-14.—Basque Roads. Cochrane destroyed part of Allemande's squadron.
1811. March 18.—Lissa. Hoste defeated Dubardieu.
1816. Aug. 27.—Algiers bombarded by Exmouth.
1827. Oct. 20.—Navarino. Codrington, with French and Russian help, destroyed the Turko-Egyptian fleet.
1840. Nov. 3.—Acre bombarded by Stopford.
1854. Oct. 17—Sept. 17.—Sebastopol bombarded.
1882. July 11.—Alexandria bombarded by Seymour (Lord Alcester).

The chief battles in which British troops have been engaged are (excluding the battles of the English Civil wars) the following :—

1106. Sept. 29.—Tenchebrai. Henry I. defeated the Normans.
1119. Aug. 20.—Brenneville. Henry I. defeated the Normans.
1191. Spring.—Ascalon. Richard I. defeated Saladin.
1314. June 25.—Bannockburn. The English defeated by the Scots.
1338. July 29.—Halidon-Hill. The English defeated the Scots.
1346. Aug. 6.—Crécy. Edward III. defeated the French.
1356. Sept. 19. — Poictiers. Edward III. defeated the French.
1415. Oct. 25.—Agincourt. Henry V. defeated the French.
1421. March —.—Beaugé. The Duke of Clarence defeated by the French.

1423. July 31.—Crévant. Henry VI. defeated the French.
1424. Aug. 16.—Verneuil. The Duke of Bedford defeated the French.
1429. June 10.—Patay. The English defeated by Joan of Arc.
1513. Sept. 9.—Flodden. The Earl of Surrey defeated the Scots.
1542. Dec. 14.—Solway Moss. The English defeated the Scots.
1598. ——.—Blackwater. Sir Henry Bagnall defeated by O'Neil.
1602. Aug. 4. — Steinkirk. William III. defeated by Luxemburg.
1704. Aug. 2.—Blindheim (Blenheim). Marlborough and Eugene defeated Tallard.
1706. May 23.—Ramillies. Marlborough defeated Villeroi.
1707. July 16.—Almanza. Galway defeated by Berwick.
1708. July 11.—Oudenarde. Marlborough defeated Vendôme.
1709. Sept. 11.—Malplaquet. Marlborough defeated Villars.
1743. June 27.—Dettingen. George II. defeated De Noailles.
1745. May 11.—Fontenoy. Cumberland defeated by Saxe.
1751. Aug. 30 to Oct. 29.—Arcot, Defence of, by Clive.
1757. June 23.—Plassey. Clive defeated Surajah Dowlah.
1759. Sept. 15.—Quebec. Wolfe defeated Montcalm.
1760. Jan. 22.—Wandewash. Coote defeated Lally.
1764. Oct. 23.—Buxar. Monro defeated the Vizier of Oude.
1775. April 19.—Lexington. English defeated by Americans.
1775. June 17.—Bunker's Hill. Gage defeated the Americans.
1776. Aug 27.—Long Island. Howe defeated the Americans.
1777. Aug. 16.—Bennington. Baum defeated by Stark (American).
1777. Sept. 13.—Brandywine. Howe defeated Washington.
1777. Sept. 19.—Stillwater. Burgoyne defeated by the Americans.
1777. Oct. 16.—Saratoga. Burgoyne surrendered to Gates.
1778. June 29.—Monmouth. Washington defeated Clinton.
1780. Aug. 16.—Camden. Cornwallis defeated Gates.
1781. Oct. 19. — Yorktown. Cornwallis surrendered to Washington.
1799. May 4.—Seringapatam, Storming of.
1801. March 21.—Alexandria. Abercromby defeated the French.
1803. Sept. 23.—Assaye. Wellesley defeated the Mahrattas.
1803. Nov. 1.—Laswaree. Lake defeated the Mahrattas.
1803. Nov. 28.—Argaum. Wellesley defeated the Rajah of Berar.
1806. July 4.—Maida. Stuart defeated the French.
1808. Aug. 17.—Rolica. Wellesley defeated Laborde.
1808. Aug. 20.—Vimiera. Wellesley defeated Junot.
1809. Jan. 15.—Corunna. Moore defeated Soult.
1809. July 28.—Talavera. Wellesley defeated Victor and King Joseph.
1810. Sept. 27.—Busaco. Wellington defeated Masséna.
1811. March 5.—Barossa. Graham defeated Victor.
1811. May 5, 6.—Fuentes d'Onoro. Wellington defeated Masséna.
1811. May 16.—Albuera. Beresford defeated Soult.
1812. Jan. 19.—Ciudad Rodrigo captured by Wellington.
1812. April 7.—Badajos captured by Wellington.
1812. April 10.—Villa Franca. Cotton defeated Soult.
1812. May 19.—Almaraz. Hill defeated Marmont.
1812. July 22.—Salamanca. Wellington defeated Marmont.
1813. June 21. — Vittoria. Wellington defeated Joseph Bonaparte.
1813. July 25—Aug. 2.—Wellington's victories in the Pyrenees.
1813. Aug. 31.—San Sebastian, Storming of, by Graham.
1814. Feb. 25.—Orthes. Wellington defeated Soult.
1815. Jan. 8.—New Orleans, Drawn battle near.
1815. June 16.—Quatre Bras. Wellington engaged Ney.
1815. June 18.—Wellington defeated Napoleon Bonaparte.
1817. Nov. 5. — Kirkee. Elphinstone repulsed the Pindarees.
1817. Dec. 21.—Maheidpore. Hislop defeated Holkar.
1826. Jan. 18.—Bhurtpore stormed by Combermere.
1839. July 23.—Ghuznee captured by Keane.
1843. Feb. 17.—Meanee. Napier defeated the Beloochees.
1845. Dec. 18.—Moodkee. Gough defeated the Sikhs.
1845. Dec. 21.—Ferozeshah. Gough defeated the Sikhs.
1846. Jan. 28.—Aliwal. Smith defeated the Sikhs.
1846. Feb. 10.—Sobraon. Gough defeated the Sikhs.
1849. Jan. 13.—Chillianwallah. Gough defeated the Sikhs.
1849. Jan. 21.—Mooltan captured by Whish.
1849. Feb. 21.—Guzerat. Gough defeated the Sikhs.
1854. Sept. 20.—The Alma. Raglan and St. Arnaud defeated Menschikoff.
1854. Oct. 25.—Balaclava. Allies defeated the Russians.
1854. Nov. 5.—Inkerman. Allies defeated the Russians.
1855. Sept. 8.—The Redan, Unsuccessful British assault on.
1857. Feb. 8.—Kooshab. Outram defeated the Persians.
1857. July 16.—Cawnpore. Havelock defeated Nana Sahib.
1857. Sept. 20.—Delhi retaken by Wilson.
1857. Nov. 25.—Cawnpore. Campbell and Havelock defeated the rebels.
1858. April 4.—Jhansi captured by Rose.
1859. Feb. 10.—Horsford defeated Nana Sahib.
1859. May 23.—Jorwah. Grant defeated Nana Sahib.
1860. June 30.—Taranaki. British defeated by New Zealanders.
1860. Nov. 6.—Mahoetaki. Pratt defeated New Zealanders.
1864. Apr. 29.—British defeated by New Zealanders at Gate Pah.
1865. Feb. 25.—Cameron defeated the New Zealanders.
1868. April 13.—Magdala stormed by the British under Napier.
1874. Jan. 31.—Amoaful. Wolseley defeated the Ashantees.
1874. Feb. 4.—Ordashu. Wolseley defeated the Ashantees.
1878. Dec. 2.—Peiwar Pass. Roberts defeated the Afghans.
1879. Jan. 22.—Isandhlana. Chelmsford defeated by Cetewayo.
1879. Jan. 22.—Rorke's Drift, Defence of, by Chard and Bromhead.
1879. March 29.—Kambula. Wood defeated Cetewayo.
1879. April 2.—Futtehabad. Gough defeated the Afghans.
1879. April 2.—Ginghilovo. Chelmsford defeated the Zulus.
1879. July 4.—Ulundi. Chelmsford defeated the Zulus.
1879. Oct. 6.—Charasia. Roberts defeated the Afghans.
1879. Dec. 23.—Sherpur. Roberts defeated the Afghans.
1880. April.—Ahmed Khel and Ghuznee. Stuart defeated the Afghans.
1880. July 27.—Maiwand. Burrows defeated by Afghans.
1880. Aug. 31.—Mazra. Roberts defeated Ayoub Khan.
1880. Dec. 20.—Brunker's Spruit. British defeated by Boers
1881. Jan. 28.—Laing's Nek. Colley defeated by the Boers.
1881. Feb. 8.—Ingogo river. Colley defeated by the Boers.
1881. Feb. 27.—Majuba Hill. Colley defeated by Boers.
1882. Aug. 24.—Ismailia. British defeated Egyptians.
1882. Aug. 25.—Mahsameh. Lowe defeated the Egyptians.
1882. Aug. 28.—Kassassin. Graham defeated the Egyptians.
1882. Sept. 13.—Tel-el-Kebir. Wolseley defeated Egyptians
1884. Feb. 20.—El Teb. Graham defeated the Arabs.
1884. March 13.—Tamai. Graham defeated Osman Digna.
1885. Jan. 17.—Abu Klea. Stewart defeated the Arabs.
1885. Jan. 19.—Metammeh. Stewart defeated the Arabs.
1885. March 22.—Tofrek. McNeill surprised by Arabs.
1885. Dec. 30.—Ginnis. Stephenson defeated the Arabs.
1890. Aug. 3.—Toski. Grenfell defeated Arabs.
1891. Feb. 19.—Tokar. Grenfell defeated Osman Digna.
1895. April 3.—Chitral. Malakhand Pass stormed.
1897. Oct. 20.—Dargai. Lockhart defeated Afridis.
1898. April 8.—Atbara. Kitchener defeated Dervishes.
1898. Sept. 2.—Omdurman. Kitchener defeated Dervishes.
1899. Oct. 20.—Glencoe. General Symons checked Boers.
1899. Oct. 21.—Elandslaagte. White repulsed the Boers.
1899. Oct. 30.—Nicholson's Nek. Boers captured part of British force.
1899. Nov. 28.—Modder River. Methuen engaged Boers.
1899. Dec. 11.—Magersfontein. Methuen repulsed by Boers.
1899. Dec. 15.—Colenso. Buller repulsed by Boers.
1900. Jan. 17.—Spion Kop. Buller repulsed by Boers.
1900. Feb. 15.—Kimberley relieved by French.
1900. Feb. 27.—Paardeberg. Roberts defeated Boers.
1900. Feb. 28.—Ladysmith relieved by Buller.
1900. May 17.—Mafeking relieved by Mahon.
1901. Sept. 26. Moedwil. Kekewich engaged Boers.
1902. March 7. Tweebosch. Methuen captured by Boers.
1902. April 11.—Hoolwall. Kekewich defeated Boers.
1902. May 7.—Ookiep. Relieved by Cooper.

Battle, WAGER OF, a quasi-judicial form of trial introduced into English procedure by the Normans. Instances of the custom are frequent enough in early English history, and an illustration will be found in Shakespeare's *Henry VI.*

pt. II. i. 3. Cases occurred in the Stuart period—notably that of Lord Rea. In 1818 one Ashford appealed in the King's Bench against Thornton, who had been acquitted of the murder and violation of Ashford's sister. The defendant "waged his battle" and the appellant allowed the charge to drop. Next year an Act (59 Geo. III. c. 46) was passed to abolish trial by battle.

Battue (Fr. *battre*, to beat), a method of killing game, in which it is driven towards the shooters by beaters. The word first occurs in English in 1816, and the practice seems to have been introduced early in the 19th century. Though often condemned as unsportsmanlike, it no doubt affords opportunity for the display of skilful and rapid shooting, though it is without the exercise or the danger (except sometimes to the beaters) which are essential elements in many forms of sport. Commonly two guns are used alternately, at least by the shooters in the best positions, and a man is placed behind each shooter to load for him. Enormous numbers of birds, chiefly pheasants, as well as hares, etc., are shot at battues, 2,000 head of game frequently having been killed in a day.

Baudelaire, CHARLES, was born at Paris in April, 1821. After residing for a while in the East Indies he returned to Paris and became rather a distinguished figure in the romantic school of poetry. His *Les Fleurs du Mal*, portions of which first appeared in the *Revue des Deux Mondes*, on account of their immorality led to a prosecution when they appeared in volume form in 1857. More pleasant reading was furnished by his fifty *Petits Poëmes en Prose*, and his critical essays which were collected under the title of *L'Art Romantique*. His translation of the works of Edgar Allan Poe is for accuracy and brilliance considered the best in literature. Some suppressed poems were published in Brussels under the title of *Les Épaves*. He died in 1867.

Baudry, PAUL, was born at La Roche-sur-Yon in 1828. He is best known as the author of *Punishment of a Vestal Virgin*, and *The Assassination of Marat*. For ten years he was engaged in decorating the *foyer* of the Grand Opera, Paris, and in 1870 was elected a member of the Académie des Beaux-Arts. He died in 1886. See *Magazine of Art*, September, 1886.

Bauer, BRUNO, was born at Eisenberg, Duchy of Saxe-Altenberg, in 1809. After studying at Berlin and holding an appointment in the university there and at Bonn, he turned to writing on theological and political subjects. His writings were mostly of a controversial character and landed him in many disputes. He also wrote histories relating to the eighteenth century, the leading idea that he sought to expound in them being that the popular struggles of the nineteenth century failed through the character of the enlightenment of the eighteenth. He died in 1882, the year in which was published *Disraelis romantischer und Bismarck's sozialistischer Imperialismus*, his last work.

Baumgarten, ALEXANDER GOTTLIEB, was born at Berlin 1714. After studying at Halle, he became professor of philosophy at Frankfort-on-the-Oder. He followed Leibnitz and Wolff, and is distinguished for separating the *Theory of the Beautiful* from other departments of philosophic speculation, and was the first to use the name "Æsthetics" to designate that science. His chief works are:—*Disputationes de nonnullis ad poema pertinentibus*, *Æsthetica* (incomplete), *Metaphysica*, *Ethica philosophica*, *Initia philosophiæ practicæ primæ*. He died in 1762.

Baur, FERDINAND CHRISTIAN, son of a Würtemberg pastor, was born at Schmiden, near Stuttgart, in 1792. From the Blaubeuren seminary he passed to the Tubingen university, becoming professor in the former institution in 1817 and in the latter in 1826. He died at Tubingen in 1860, after achieving great distinction as a theologian and being the founder of a distinct line of theological speculation known as the "Tubingen school." His first literary effort, *A Review of Kaiser's Biblical Theology*, was published in 1817, and in 1824 appeared his first elaborate work, *Symbolik und Mythologie*, an exposition of ancient religions. In 1831 the *Christ-party in the Corinthian Church and the Antagonism betwixt the Pauline and Petrine Christianity* appeared; in 1835 *The Christian Philosophy of Religion*; in 1838 *The Christian Doctrine of the Atonement*; in 1836 *The Opposition between Catholicism and Protestantism*, a reply to Mohler's *Symbolik*, which was an attack on the Protestant Church; in 1835 the *So-called Pastoral Epistles*, in which he impugns St. Paul's authorship, and refers them to the second century; in 1841 *The Christian Doctrine of the Trinity and the Incarnation*; in 1847 *Handbook of the History of Dogma*; and other historical works on Christian doctrines. The chief bearing of Baur's writings was to show that the books of the New Testament were written at a period posterior to the period they are assigned to, and to call in question their authorship. In the case of the Gospels, for instance, St. Luke's, according to him, is a product of the second century, as is also St. John, and, if not later, St. Mark. St. Matthew is the earliest, and as for John being the author of the gospel bearing his name and of the Apocalypse, Baur held that to be impossible.

Bautzen, or BUDISSIN, which in Wendish means town, is the capital of Saxon Upper Lausatia, and is situated on the right bank of the Spree. It is an old town, and early acquired wealth and distinction through the "Arm of St. Peter" that was preserved in one of its churches, to which pilgrimages were made. It suffered greatly in the Hussite and Thirty Years' wars, being burned on one occasion, and at the Peace of Prague, in 1635, passed with Lausatia to Saxony. On May 21st and 22nd, 1813, the battle of Bautzen was fought between Napoleon and the allied forces of Russia and Prussia, the former winning a barren victory. Besides churches and other public buildings, Bautzen has a cathedral, in which both Protestants and Roman Catholics worship. Its manufactures include cotton, linen, wool, tobacco, leather, paper, gunpowder, etc

Bavaria, one of the southern kingdoms making up the German Empire, consists of two parts: Bavaria proper and the Palatinate of the Rhine. It extends to 29,549 English square miles. There are eight government districts; of these Upper Bavaria is largest, and Lower Bavaria next.

Boundaries and Physical Geography. Bavaria is bounded on the north by the Fichtelgeberge and the Frankenwald; on the south by the Tyrolese Alps; towards the east by the Böhmerwald; on the west by Würtemberg, Baden, and Hesse Darmstadt. The Danube and the Main are the chief rivers. Although there are no great mountains, the general character of the country is hilly. The climate is warmer in summer and colder in winter than is the case in England. A fourth of the area is wood, and a third of that state property.

Population and Industries. The total population was 6,524,372 in 1905. This shows an annual increase of about 8 per cent. during the preceding five years. About one-third of the whole is urban and two-thirds rural; but the town districts are becoming slowly more populous at the expense of the country. Owing to marriage restrictions, the illegitimate births are inordinate. In this respect Bavaria has an unenviable pre-eminence. In Munich such births have been known to equal the lawful increase. The annual emigration from Bavaria is large. In 1906 it was 3,450. In 1883 it was as much as 17,986. Munich, the capital is much the largest town; in 1905 it contained 538,983 persons. Nuremberg, the next town, had 294,426 in the same year. Rather more than seven-tenths of the population of Bavaria are Roman Catholics. The chief industries are agriculture and mining. The mineral deposits are of great variety and excellence. It was not till 1868 that the mediæval system of guilds was abolished by law. Nuremberg has for centuries been an industrial centre. Munich and Augsburg are also important. Beer is brewed everywhere, but especially at Erlangen and Munich. The average quantity is 278 millions of gallons. Twenty-seven millions are exported.

Government, Revenue, etc. The *Magna Charta* of Bavaria is a Constitutional Act passed on May 26th, 1818, since which further change in a popular direction has been made. The king has the sole executive power, which he exercises through ministers. There is an Upper and a Lower House. The first is composed of the princes of the blood royal, dignified ecclesiastics, Roman Catholic and Protestant, certain members of the nobility, and about sixteen life councillors nominated by the king. The Lower House consists of 163 deputies elected for six years. Under the electoral law of 1906, the election of deputies is direct and secret. The particulars of revenue for the year 1908–9 were: Direct taxes, 46,000,000 marks; indirect, 48,847,680 marks; State railways, mines, etc., 331,415,664 marks; making with smaller items a total of 546,032,094 marks. The chief particulars of expenditure were: Public debt, 68,072,285 marks; administration and pensions, 326,032,030 marks; religion and education, 89,061,777 marks; share of imperial expenditure, 36,699,381 marks. (A mark is very nearly a shilling, English money.) Bavaria contributes 68,426 men to the imperial army. This is the peace establishment. In time of war the force is increased threefold. In dress and some other minor details the Bavarian contingent is different from the rest of the German army. Justice is administered by twenty-eight *Landgerichte*, or local tribunals. Also there are five *Oberlandesgerichte*, and over these again is the *Oberstes Landgerichte*, a supreme Bavarian court, composed of twenty-two judges. It sits in Munich, and from its decision the appeal is to the *Reichgerichte*, or imperial tribunal of the German Empire. There are about 200,000 temporary and permanent paupers, costing the State nearly 11,600,000 marks annually. The level of educational attainment is high. From six till fourteen all children must go to one of the four classes of schools—Catholic (about 5,100), Protestant (1,900), mixed (144), Jewish (86). There is a university at Munich.

History. The German name of Bavaria is *Baiern*, a word of undoubtedly Celtic origin. Rome had some uncertain hold on the wandering tribes which during the time of her power inhabited this region. Charles the Great made Bavaria part of his kingdom, and his successors ruled here after the dismemberment of his empire as margraves. In 921 the margrave was made a duke. In 1620 the duke was made an elector in return for services rendered to the empire, and his territory increased by a slice of the Palatinate. About the middle of the eighteenth century Bavaria deserted the German for the French alliance, and after Blenheim (1704) the elector lost his kingdom for ten years. His son was constant to the French alliance, and was also driven from his dominion; but on his death the country was restored to Maximilian Joseph, the next heir, under whom began a long period of peace, that only terminated in 1793 with the wars of the French Revolution. On the whole, Bavaria supported Napoleon (who made her a kingdom) till 1813, after which she was induced to join the other German states in their combined attack on the French. In 1866 she sided with Austria against Prussia, but on the victory of the latter she veered round to her side, and was her firm ally in the contest of 1870 with France. Her history closes with the treaty of November 23rd, 1870, that made her an integral part of the new German Empire. The royal house are descended from the mediæval Counts of Wittelsbach. King Otho, the present ruler, was born in 1848, and succeeded in 1886 on the suicide of his brother, Louis, whose eccentricity, long notorious, had developed into insanity. He is also insane, and his uncle, Prince Luitpold, is regent.

Baxter, RICHARD, was born at Rowton, Shropshire, November 12th, 1615. His parents were poor, and his early education was neglected. He was very diligent, however, in acquiring knowledge, his taste inclining towards religious philosophy. At first he sought to make his way at court, and with an introduction to Sir Henry Herbert set out for London. After a month at Whitehall, followed by an illness, he resolved upon a career in the church. At the age

of twenty-three he was ordained by the Bishop of Worcester, and became master of Dudley grammar school. He soon acquired popularity as a preacher, and was next appointed assistant to a Bridgenorth clergyman. In 1641 he was invited to become minister of Kidderminster, where with interruptions he remained for about nineteen years—the interruptions being due to the Civil war. Though a supporter of monarchy, he yet sympathised with the Puritans; and though he sympathised with the Puritans, he yet did not go the whole length of considering episcopacy unlawful. His position was thus a difficult one, and Worcester being a cavalier stronghold, Baxter withdrew to Gloucester and thence to Coventry, where he preached regularly to the garrison and citizens for about a couple of years. After acting as chaplain to Colonel Whalley's regiment, and being present at the sieges of Bridgewater, Exeter, Bristol, and Worcester, he was invited back to Kidderminster, where at this period he produced his *Saints' Rest* and *Call to the Unconverted*. After the Restoration he was appointed one of the king's chaplains, and exerted himself chiefly, though futilely, in endeavouring to bring about a reconciliation between the contending church factions. The Act of Uniformity compelled him to sever his connection with the church altogether, and he settled in 1663 in Acton, Middlesex, where he devoted his time to authorship. By the Act of Indulgence (1672) he was enabled to return to London, and in 1685 he was condemned to pay a fine for alleged sedition. The fine was not paid, and Baxter, though now seventy years of age, lay in prison for two years. Thereafter he lived in peace, dying December 8th, 1691. He was a very prolific writer, his publications exceeding 160 in number. Dean Stanley named him "the chief of English Protestant schoolmen."

Bay, in *Geography*, is a wide-mouthed opening of the sea into the land. A gulf is a larger and wider opening, while a large space of salt water, chiefly enclosed by land, is a sea. But the terms are used rather loosely. The White Sea and the Bay of Bengal might with equal propriety be called gulfs.

Bay, generally used in English gardens as the name of the laurel, *Laurus nobilis*, an evergreen shrub native to southern Europe, reaching a height of from thirty to sixty feet. Branches of this plant were formed into crowns for heroes or for the statues of the gods in ancient times, and the name *Laurus* may be connected with the Latin *laus*, praise. Dried figs are packed in its aromatic leaves, and in this country these leaves are used as a flavour in cookery. To the student of plant structure the twelve stamens of the inconspicuous yellowish flowers are interesting from the valvular dehiscence of the anther. A showy garden plant, one of the willow herbs (*Epilobium angustifolium*), with rose-coloured flowers and bay-like leaves, is called ROSE-BAY. The OIL OF BAY, or BAY-BERRY OIL, used in the manufacture of the American hair-wash BAY-RUM, is distilled from the berries of the allspice, *Pimenta officinalis* and *P. acris*.

Baya. [WEAVER-BIRD.]

Bayard, PIERRE DU TERRAIL, CHEVALIER DE, was born at the Château of Bayard, near Grenoble, in 1476. He was regarded by his contemporaries as an ideal soldier and man of honour, earning the title, "the knight without fear and without reproach." He accompanied Charles VIII. to Italy, and distinguished himself at the battle of Fornovo by capturing a standard from the enemy. At Brescia, being wounded, he was taken to the house of a lady, and there nursed. On his recovery the lady made him a present of 2,000 pistoles, because of the protection he had afforded her family against the soldiers. This present he bestowed with rare gallantry on the lady's two daughters as their marriage portion. Another incident in his career was when he, in 1502, at Barletta, with ten other French knights, met in a tournament an equal number of Spaniards. In the first charge seven Frenchmen were overthrown, but after a combat of six hours' duration the result of the contest was declared equal, and Bayard credited with having saved the day for his country. Having engaged in the various wars of his time, he at last met his death wound in 1524, at the retreat of Rebec. As he lay dying, Bourbon, who led the enemy's forces, expressed pity for him—for he was held in high esteem by foes as well as friends. "Pity not me," he replied, "who die a true man. Pity is rather for yourself, who bear arms against your king, your country, and your oath." His body was ordered to be embalmed, and was interred in the church of the monastery of the Minorites, near Grenoble.

Bayazid, or BAJAZID, a city of Turkish Armenia, in the province of Erzeroum, lies about fifteen miles south-west from the base of Mount Ararat. It used to be a place of some importance, doing a considerable trade. Now, however, it is in a ruinous condition, with a population of only a few thousands. In 1854 the Turks were defeated here by the Russians, and in 1877 the latter took it. In 1878, however, the Berlin Congress restored it to Turkey.

Bay City, the third city in size in Michigan, United States, is situated on the Saginaw river. Its importance is due mainly to the railways that pass through it and have their termini here. It has also a trade in shipbuilding, lumber, and salt. It contains seventeen churches, a high school, eight public schools, and a public library.

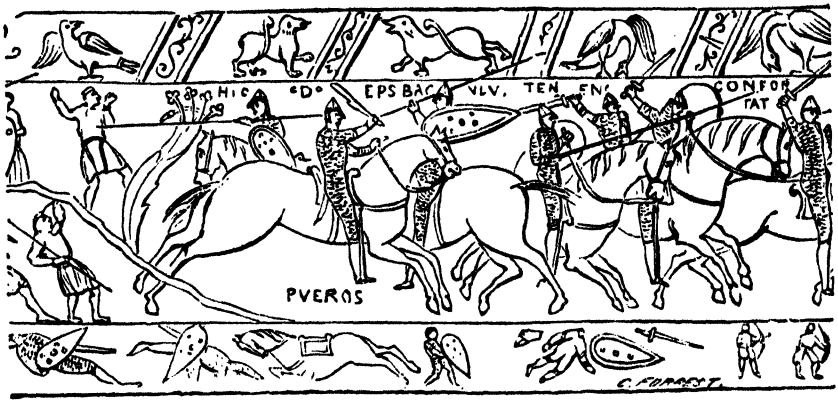
Bayeiye, the aborigines of the Lake Ngami district, South Central Africa, now reduced to slavery by the intruding Batuanas, who are of Bechuana stock. The Bayeiye belong to the same Bantu family as the Bakubas, a large and still independent nation who occupy the region between Lake Ngami and Ovampo-land; the Bakuba head chief, "King" Anduri, resides at Libebe; total population of all the Bayeiye and Bakuba tribes about 162,000.

Bayer, JOHANN, was born at Rhain, Bavaria, in 1572. He was an astronomer, the result of his

labours being given in *Uranometria* and *Explicatio*. He was so zealous a Protestant as to acquire the designation, "Mouth of the Protestants."

Bayeux, an ancient Norman city, and the capital of an arrondissement of the same name in the department of Calvados, France. It is the seat of a bishopric, and has a Gothic cathedral of great antiquity. Among its manufactures are hosiery, lace, porcelain, etc.

Bayeux Tapestry, a pictorial history of the invasion of England by the Normans, beginning with Harold's visit to the Norman court, and ending



SPECIMEN OF BAYEUX TAPESTRY.

with his death at the battle of Hastings, is so named because it was found originally in the cathedral of the town of Bayeux, where it is still preserved in the public library. It is supposed to be the work of Matilda, wife of William the Conqueror; though others claim it for the Empress Matilda, daughter of Henry I.; and a third party that it was produced as a decoration for the cathedral of Bayeux by order of Odo, the Conqueror's half-brother. The tapestry is 214 feet long and twenty inches wide; divided into seventy-two scenes, which are mostly described by Latin inscriptions. In it are the figures of 623 persons, 762 horses, dogs, etc., thirty-seven buildings, and forty-one boats. It has been reproduced several times, by drawing and by photography.

Bay Islands, a small group in the Bay of Honduras, were proclaimed as a British colony in 1852, and in 1856 were ceded to Honduras. Amongst the highest of the group is Guanaja, whence Columbus first discovered the American mainland.

Bayle, PIERRE, son of a Calvinist minister, and author of the *Historical and Critical Dictionary*, was born November 18th, 1647, at Carlat, Languedoc. His studies led him at first to renounce Calvinism for Catholicism; later, however, he returned to Protestantism, and went to Geneva, where he studied the philosophy of Descartes in place of the Peripatetic scholasticism that had been taught him by the Jesuits. In 1675 he was appointed to the chair of Philosophy in Sedan university, and afterwards to a similar chair in Rotterdam, where his lectures and publications attracted the notice of the learned of Europe. This popularity aroused animosity against him, and he was denounced as an atheist. The result was that he was forbidden to give instruction in Rotterdam, and in 1693 was deprived of his licence to teach. He, however, went on with his writings, bearing his persecutions with philosophic calmness, until his death, in 1706. His chief work was the *Dictionary*, which, though proscribed in France and Holland, yet had an enormous effect upon the thought of the Continent, and is credited with being the beginning of the scepticism of the eighteenth century.

Bayly, THOMAS HAYNES, was born at Bath October 13th, 1797. He early discovered that he had an aptitude for verse-writing, and to him we owe such well-known songs as *She wore a wreath of roses*, *The Soldier's Tear*, etc. Besides verse, he wrote a novel, *The Aylmers*, tales, and dramatic pieces, one of which, *Perfection*, was produced on the stage. He died April 22nd, 1839.

Baynes, THOMAS SPENCER, was born at Wellington, Somerset, March 24th, 1823. After being Sir William Hamilton's assistant at Edinburgh University, he became assistant editor of the *Daily News* (1857-64), and Professor of Logic in St. Andrew's University (1864-87). He edited the ninth edition of the *Encyclopædia Britannica*. He died in 1887.

Bay of Islands, a harbour on the north-east coast of the North Island of New Zealand, has on it Korovarika, the first European settlement in New Zealand.

Bayonet, a pointed, or sharpened and pointed steel weapon, adapted for fixing to the muzzle of a musket or rifle, and for use at close quarters. It

was first introduced into the French army in the middle of the seventeenth century, and it appears to have received its name from the fact, or supposed fact, of its having been invented at Bayonne. Sword-bayonets are bayonets so designed as to be available also for use as swords. Bayonets have been of many patterns and sizes. The weight and length beyond muzzle of the bayonets that have been used in the British Army are:

	Name of Arm and date.	Bayonet. Weight. lb.	oz.	Length. ft.	in.
1800	"Brown Bess"	1	2	1	5½
1800	Baker Rifle		15	1	6½
1842	Percussion Musket	1	8	1	7½
1836	Brunswick Rifle	2	0½	1	9½
1851	Minié Rifle	1	0½	1	5½
1853	Long Enfield		13½	1	5½
1860	Short Enfield	1	11½	1	10½
1864	Snider		13½	1	5½
1871	Martini-Henry III.	1	1	1	10½
1886	Enfield-Martini	1	7½	1	6½
1904	Magazine (Lee-Enfield)		15		12

In 1905 a new rifle (modified Lee-Enfield, 44·5 inches long) was introduced. The 1910 service bayonet weighs 16½ oz. and is 17¼ inches long.

Bayonne, a fortified French town in the department of Basses-Pyrénees, situated at the confluence of the Adour and Nive, four miles from the Bay of Biscay. From 1152 to 1451 it was in the possession of the English. Besides being noted for its powerful citadel, one of the finest works of Vauban, and cathedral of the twelfth century, it has also a considerable trade. It is said that the massacre of St. Bartholomew was arranged here in an interview between Catherine de Medici and the Duke of Alba, in 1565. Here also Charles IV. abdicated in favour of Napoleon. In 1814 the British and Spanish forces besieged it in vain.

Bay-window, or BOW-WINDOW (the former is the correct form), a window first introduced in Perpendicular architecture forming a *bay* or recess outwards from a room, often supplied with seats. Often found in Renaissance and late Gothic architecture, and is a feature of the modern villa.

Baza, the Bastia of the Romans and Bastamia of the Middle Ages, is a city of Andalusia, famed in early Spanish history. It lies upwards of 50 miles E.N.E. of Granada, has a college, hospital, and prison, and wine, fruit, and hemp industries.

Baza, a Negro or Negroid people of the Mareb Valley, Upper Nubia, at the north foot of the Abyssinian plateau. The Bazas, who call themselves Kunama, are a savage people at a very low stage of culture, still pagans, and speaking a language of unknown origin They have no chiefs, each village being ruled by elders. The Bazas belong to the large group of uncivilised populations collectively called Shangalla by the Abyssinians. They have been described by Munziger, Reinisch, and James (*Wild Tribes of Soudan*, 1884).

Bazaar, the market, or the part devoted to trade, of an Oriental town. In England the term is commonly applied to a number of stalls for the sale of toys and fancy articles collected into one building. The first of these, the Soho Bazaar, was established in 1816. The Pantheon, the London Crystal Palace, and other bazaars were afterwards opened in imitation of it; but most of them have since been put to other uses. The name is now most commonly applied to the sales of fancy work and other articles, got up for some charitable purpose, a practice which also seems to date from the first quarter of the 19th century.

Bazaine, FRANÇOIS ACHILLE, was born February 13, 1811, at Versailles. Entering the army in 1832, he won the cross of the Legion of Honour the following year for bravery displayed in Algeria. After fighting against the Carlists in 1837 and taking part in several African expeditions, he commanded a brigade in the Crimea in 1853. He saw further service in the Italian war of 1859, and for his services in Mexico he was made Marshal of France and Grand Cross of the Legion of Honour. In the Franco-German war he commanded the Army of the Rhine, and after being shut up in Metz for three months surrendered to Prince Frederick Charles with a force of 173,000 men. For this he was tried by court-martial and sentenced to death, which was commuted to imprisonment for life. In 1874 he escaped from prison and spent the remainder of his life in Madrid, dying in 1888. In 1883 he published his justification in a book, the sale of which was prohibited in France.

Bazalgette, SIR JOSEPH WILLIAM, engineer, was born at Enfield in 1819. After some experience in the construction of railways, he became first assistant engineer and in 1852 chief engineer to the Metropolitan Commission of Sewers. In 1856 with the formation of the Metropolitan Board of Works he was appointed engineer to that body, and in that capacity designed and carried out, in the years 1858–65, the scheme for the drainage of London. The Victoria, the Albert, and the Chelsea embankments, executed between 1863–74, are among other of his works. He died in 1891.

Bazard, SAINT AMAND, was born at Paris in 1791. He was closely identified in the revolutionary movements of his time, helping in the formation of the society of the "Amis de la Vérité," and a combination of French Carbonari, and being a leader in the "Plot of Belfort." He then, 1825, joined the Saint Simonians, editing their journal, *Le Producteur*. A series of lectures that he delivered in Paris in 1828 is published in a book entitled *Exposition of the Doctrine of St. Simon*. A close friend and fellow worker of his was Enfantin, with whom he founded a Socialist society living under its own laws. He quarrelled with Enfantin about the position of women and withdrew in 1831 from this experimental colony, dying a year afterwards.

Bazardjik, a Bulgarian town about 30 miles N. of Varna. It was founded 300 years ago, and was attacked by Russian troops in 1774 and 1810.

Bazeilles, a French village, in the department of Ardennes, only a mile or two from Sedan. The Bavarians burnt it down the day of the battle of Sedan (September 1, 1870), but with the help of English money it was soon rebuilt.

Basoche, the guild of clerks of the Parliament of Paris, which administered justice among its own members, and like some other French guilds affected the forms of royalty. It held an annual *montré*, or review, in military form. Its chief importance, however, is in the history of the drama. The privilege of performing religious plays, granted to the guild by Philip the Fair in 1303, led to the annual presentation of a morality play, satirising distinguished personages. The personalities these plays contained led to repeated interference during the 14th and 15th centuries, and, ultimately, to the suppression of the guild. The last trace of dramatic performance is in 1582. The plays may be regarded to some extent as precursors of modern comedy.

Beach, the sloping accumulation of mud, sand, or shingle between high and low water marks along the sea margin. In many places similar accumulations, known as *raised beaches*, occur above the present high-water mark, as at Brighton, Weston-super-Mare, etc. As many as four or five may occur, like terraces, one above the other, as in the north of Norway, and some of those in South America are 1,300 feet above the sea. They are sometimes accompanied by inland cliffs and sea-worn caves, and, containing as they do marine shells similar to those living in the adjoining sea, they prove alteration in the relative level of land and water to have occurred in times geologically recent. [PARALLEL ROADS, TERRACES.]

Beachy Head, a promontory 564 ft. high on the coast of Sussex, overlooking the English Channel. Below it, on June 30th, 1690, the allied English and Dutch fleets, under Herbert, Earl of Torrington, and Evertsen, consisting of fifty-six sail, met the French fleet under De Tourville, consisting of seventy-eight sail and twenty-two fire-ships. Torrington, in pursuance of peremptory orders from the court, but against his better judgment, accepted battle, and was worsted, though not decisively. The English lost two, and the Dutch six ships. Torrington was tried for cowardice and treachery, and although he was triumphantly acquitted was deprived of his commission by the king, who sought thus to appease his Dutch subjects.

Beacon. The derivation of this word is from the Anglo-Saxon *beacnian*, to beckon or call together. In the ancient times beacons were set up on hills and towers, and pitch, hemp, and other materials were burnt in an iron pot (which formed part of the beacon) whenever it was necessary to alarm the country or call the inhabitants together upon the invasion of an enemy. The practice is of great antiquity, being referred to by the prophet Jeremiah (vi. 1), and in the *Agamemnon* of Æschylus the news of the fall of Troy is supposed to be transmitted by beacon-fires to Argos in one night. In mediæval England and Scotland a system of beacon-signalling was carefully kept up, especially on the approach of the Spanish Armada and during the long war with Napoleon. Superseded for warlike purposes by the electric telegraph and the heliograph, the chief recent instance of their use was at Queen Victoria's Jubilee in 1887, when the flames of a beacon on Malvern Hill gave the signal for the lighting of a multitude of others throughout the kingdom. Beacons are frequently to be met with in heraldry, though always in one regular conventionalised form. For the use of the word in nautical language, *see* LIGHT-HOUSE.

Beaconsfield, a town in Buckinghamshire, near Windsor, was the home of the poet Waller, who was also buried here, and Edmund Burke. From it was taken the title of the Earl of Beaconsfield, Benjamin Disraeli. Pop. (1901), 2,885.

Beaconsfield, THE RIGHT HON. BENJAMIN DISRAELI, first EARL OF, K.G., was born December 21, 1804, in Bloomsbury Square, London. In 1827 he published *Vivian Grey*, and immediately thereafter went travelling through Eastern Europe and the Levant for four years. In 1832 he offered himself for election to Parliament, standing for High Wycombe as a Radical and being defeated. He then turned to literature, producing *The Young Duke*, *Venetia*, *Henrietta Temple*, *The Letters of Runnymede*, *The Crisis Examined*, etc. In 1835 he stood for Taunton as a Tory and was again defeated. In 1837, however, he was returned for Maidstone, and delivered his maiden speech December 7th of the same year, and in 1841 he represented Shrewsbury. In 1844 he published *Coningsby*, and in 1845 *Sybil*. Meanwhile, in 1839, he had married Wyndham Lewis's widow, and with the aid of her fortune purchased Hughenden in Buckinghamshire, a division of which county he was returned to represent in 1847. He now became leader of the Conservatives in the House of Commons, and when Lord Derby took office in 1852 he was appointed Chancellor of the Exchequer. The Government remained in power only a few months, and it was not until 1858 that Mr. Disraeli again assumed office under Lord Derby. His tenure of office was again short, the Government being wrecked on a Reform Bill for putting the town and county franchise on the same level. In 1866 he returned to office, and on the resignation of Lord Derby in 1868 he became premier, for only a brief period however. *Lothair* appeared in 1870. In 1871 his wife, who had been created Lady Beaconsfield, died. In 1874 at the polls the Liberals were defeated, and Mr. Disraeli now took the reins of government, and held them for six years. In 1877, finding the work of the House of Commons too heavy for his increasing years, he accepted a peerage, and as Earl of Beaconsfield retired to the House of Lords. In the following year he with the Marquis of Salisbury as plenipotentiaries represented England at the Berlin Congress, and it was on his return home that he made the famous remark, "We bring you peace with honour." At the general election of 1880 his party was severely defeated, and on April 19th, 1881, he died, a few months after the publication of his last work, *Endymion*. Besides novels, he published in 1834 *A Vindication of the English Constitution*, in 1839 *Alarcos, a Tragedy*, and in 1852 *Life of Lord George Bentinck*.

Bead, in *Architecture*, a small round moulding for ornamental purposes. Picture-frames and various objects carved in wood are often decorated with beading.

Beadle (connected with the verb *bid*), properly a summoning officer. There are parish beadles, church beadles, and the beadles of various companies. The first and last of these are employed in various ways, in announcing meetings, summoning persons to attend, carrying messages, etc.; the duties of the church beadle commonly are to assist the churchwardens in seating the congregation, and to preserve order in church. [BEDELL.]

Beadlet, the popular name of the common English sea anemone (*Actinia equina*, Linn.). It is usually about one inch in height and from one to four inches in diameter. It varies greatly in colour and markings: it may be liver-brown, green, orange, scarlet, crimson, or red, and spotted with yellow or green. It lives as a rule attached to rocks, and occurs all round the English coasts. [*See* ACTINIA for an account of its anatomy.]

Beads are small spherical or cylindrical ornaments, made of stone, wood, bone, ivory, jet, or amber, or most generally of glass, and so perforated that they can be strung on threads or sewn on cloth as decorative embroidery. Wooden and ivory beads are often elaborately carved; glass beads are found in the earliest known Egyptian tombs, and *aggry beads*, now highly valued all over West Africa, were probably used for barter with the natives by the ancient Phœnicians. Since the fourteenth century glass beads have been largely manufactured at and near Venice. The glass is drawn out into rods of very small diameter, which are then cut into very short lengths, and while still soft are rounded and polished. The name is in fact derived from the old English *bede*, a prayer. From the use of beads on rosaries (q.v.), to tell one's beads became synonymous with saying prayers, and *bedesmen* existed in the Middle Ages whose function it was to pray for the persons who employed them. In Scotland the king's bedesmen, or blue-gowns, were privileged beggars.

Beagle, a variety of the Hound, smaller than the Harrier (q.v.) and, like that breed, used for hare-hunting.

Bean, the name commonly applied to *Faba vulgaris*, the broad or Windsor bean, to its seeds or to other plants, mostly leguminous, having large seeds. The bean is an annual leguminous plant, believed to be a native of the eastern Mediterranean region, cultivated probably before B.C. 1000. It is an erect plant, two to four feet high, with quadrangular stem, pinnate leaves of four to eight oval leaflets, fragrant white flowers blotched with violet, large green pods, and roundish kidney-shaped flattened seeds. The precept of Pythagoras to his followers to abstain from beans has been explained as a figurative advice not to meddle with politics, beans being used in the Athenian ballot; and the Roman family of the Fabii are said to have derived their name from success in the cultivation of beans. Beans were probably introduced into England by the Romans, and are now largely grown as food for both horses and men. The French or kidney bean is the unripe pod of *Phaseolus vulgaris*; the scarlet-runner, that of *P. multiflorus*. The haricot bean is the ripe seed of *P. vulgaris*; the Lima bean, a favourite in America, that of *P. lunatus*.

Beanfeast, the annual dinner given by employers to their workmen, either from the season in which it took place, or because beans, or a bean-goose, were part of the bill of fare.

Bean Goose. [GOOSE.]

Bear, the popular name for any individual of the genus Ursus, the type of the Arctoid family Ursidæ, which also contains the genus Ailuropus, connecting the true bears with the Ailuridæ. [PANDA.] The species of the type-genus, though not very numerous, are extensively distributed, but are entirely absent from the Australian and Ethiopian regions, and have only one representative in the Neotropical region—*U. ornatus*, the Spectacled Bear, from the Peruvian and Chilian Andes. Bears are stout-built animals of considerable size, some of the forms being the largest of the Carnivora. They are the best examples of Cuvier's group Plantigrada (a name which is rapidly falling, if it has not already fallen, into disuse), the whole of the sole of the foot being applied to the ground in walking. They are the least carnivorous of the whole order, the majority being omnivorous, and some almost entirely vegetable-feeders, only the polar bear and the grizzly bear being flesh-eaters to any great

SKULL OF THE BEAR.

extent, and of these two the former eats grass greedily in the summer, and the latter feeds largely on acorns. The dental formula I. $\frac{3-3}{3-3}$ C. $\frac{1-1}{1-1}$ PM. $\frac{4-4}{4-4}$ M. $\frac{2-2}{3-3}$ = 42; the incisors and canines resemble those of the other Carnivora, but the sectorial tooth has a tuberculate crown for grinding and crushing, totally unlike the sharp cutting edges of the corresponding tooth in the lion and tiger. The claws are large, strong, and slightly curved, but cannot be retracted within sheaths, as in the cats, and are better fitted for digging than for seizing and tearing prey. The tongue is smooth, without the horny papillæ so marked in the cats; the ears are small, erect, and rounded, the tail short, and the nose forms a movable truncated snout. The soles of the feet are naked (except in the polar bear), and the fur is for the most part long, soft, and shaggy. Although so heavily built, bears can run and swim with considerable speed. Many species are good climbers, though they always come down backwards, just as a man

descends a ladder. Most of them undergo at least a partial hibernation, and on recovering from this state the female brings forth her young. The earliest known bear is *U. theobaldi*, from the Pliocene of India. Remains of this genus have also been obtained from the Upper Pliocene and Pleistocene of Europe, and the Pleistocene of America. [CAVE BEAR.]

Bears have played a considerable part in the folklore of the human race, and especially in that of the northern nations. The jocular name given to these animals by some of the German peoples—Bruin—comes from the bear (who is named *Bruin*, or brown, from the colour of his fur) in the mediæval poem of Reynard the Fox (q.v.). From the earliest ages they have been beasts of chase, they were used in the games of the Roman amphitheatre, and, if Martial (*Spec. Lib.*) may be credited, as ministers of justice on malefactors. They are important commercially, for the fur of nearly all the species is valuable, the fat is made into "bear's grease," and the paws and hams are esteemed as delicacies.

The genus Ursus may be divided into four sections, to all of which some writers have given generic rank.

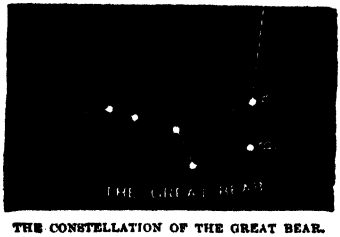
1. Ursus proper, containing the land bears. [BLACK BEAR, BROWN BEAR, GRIZZLY BEAR, SPECTACLED BEAR, SYRIAN BEAR.]

2. Thalassarctos, having a comparatively small head, small, narrow molar teeth, and the soles covered with hair. [POLAR BEAR.]

3. Helarctos, having the head short and broad, and the tongue long and extensile. [SUN BEAR.]

4. Melursus, having the first upper incisor absent, or shedding it very early, lips very large and extensile. [SLOTH BEAR.]

Bear, GREAT (*Ursa Major*), one of the most familiar constellations in the northern heavens. In those latitudes near London it never sets, and may



THE CONSTELLATION OF THE GREAT BEAR.

therefore be always observed on any clear night. The seven chief stars are shown in the figure; α and β are known as the *pointers*, on account of the Pole-star lying at a short distance away in a straight line with them. This latter is the chief star in the Little Bear, and lies very close to the point known as the *pole* of the heavens, towards which the axis of the earth now points.

Bear Animalcula. These form the order Tardigrada, a division of the ARACHNIDA. They are minute lice-like animals, creeping by four pairs of short stumpy legs. The points of structure which separate them from other Arachnida are the fact that they are hermaphrodite, *i.e.* there is no division of sexes, the possession of a suctorial mouth, and the absence of heart and respiratory organs. They live in moss and in puddles in house gutters, etc.: they can survive for a long period in a dry state, and recover their activity when moistened. They are also known as the "sloth animalcules"; they have, however, no connection with the true "animalculæ."

Bear-baiting, with dogs, was for some centuries a popular sport in most European countries. In England, where it was only prohibited by statute in 1835, it dates from the time of Henry II., and was patronised by Queen Elizabeth. Most English towns maintained bears, bear-dogs, and a bear ward, or official to supervise the sport.

Bear-berry (*Arctostaphylos*), a genus of prostrate shrubs belonging to the heath tribe. They have small leaves, small terminal clusters of flowers, like those of *Arbutus*, with a persistent calyx and a smooth berry-like fruit with five one-seeded stones. Two species occur in Scotland, and other northern regions in both hemispheres, their berries forming part of the food of grouse. *A. uva-ursi*, which has scarlet fruit, is an astringent, used medicinally in urinary affections, for tanning and to remove boiler-crust. *A. alpina*, the black bear-berry, is the badge of the clan Ross.

Beard. The appearance of the beard, whiskers, and moustache is usually the distinctive sign of the advent of manhood, though it occasionally occurs in women, especially with advancing age and (it is said) in those of dark complexion. The growth of the beard varies greatly in different individuals, still more in different races. It is especially conspicuous in Semitic peoples, and in the Slavonic and Keltic divisions of the Aryan race; while some savage races—the Indians of North America, for instance—are almost beardless. The beard is carefully cultivated by some Eastern nations, Turks, Arabs, and Persians, and especially by Mahometans, and often dyed red with henna, and its removal is regarded as a degradation. Sometimes, however, it is shaved in time of mourning, as in ancient Greece. The ancient Egyptians, however, reversing the contemporary practice in this as in other matters, shaved as a rule and let their beards grow during mourning, though they sometimes wore false beards, differing according to the rank of the wearer. The Assyrian sculptures show long beards. Leviticus xix. 27 forbids trimming the corners of the beard (*cf.* Ezek. v. 1).

The ancient Greeks usually wore beards; the Homeric heroes are bearded; but Alexander the Great is said to have compelled his Macedonians to shave, saying "that there was no better hold in battle than a beard." The philosophers of later times, however, always wore their beards as a kind of professional badge. Shaving was introduced into Rome about 300 B.C., and it is said Scipio Africanus (about 200 B.C.) was the first Roman who shaved daily. The first hair shaved off by the young man was commonly offered to a god. Shaving was

general, at least in good society, till Hadrian's time (117 A.D.), though we occasionally hear of "daintily trimmed beards" as a mark of foppery (as in Cicero's letters), and a long untrimmed beard was considered as a sign of slovenliness and squalor. The Emperor Hadrian wore a beard, it is said, to conceal scars on his face; and either from this, or as part of the growth of Oriental practices in Rome, beards were worn thenceforth till the time of Constantine. Under Charles the Great the nobles usually shaved, but beards were worn from the tenth to the twelfth century. Shaving was then generally practised throughout the Middle Ages; the Normans introduced it into Britain, but beards were occasionally worn by the higher classes, as by Edward III. Henry I. had to shave his beard as a penance. With Elizabeth's reign beards became common and often fantastic in form. Under Charles I. and Charles II. the "Vandyke" peaked beard and moustache were worn, familiar from the portraits of these kings; but afterwards shaving became common all over Europe until the 19th century was well advanced. In France, under Louis XIV. it was worn for a time, and powdered; but as the powder would not stay on, it became usual to shave the face closely, except that officers were allowed to wear moustaches—a privilege reserved under the First Empire for veterans only. Foreign military service has been the chief agent in restoring the practice of wearing the beard in England and France. In the former it dates from the subjugation of Algeria (1830), though officials and members of the Bar are still closely shaven; in the latter from the Crimean war, though Anglo-Indians wore it earlier. The value of the beard as a protection against throat complaints is now very generally insisted on. There is much greater diversity of practice in this matter of late years. The Roman Catholic priests are shaven, the Greek priests bearded; in the Anglican Church there has been a considerable increase of late years among the clergy who wear beards, though Bishop Ryle (1881) introduced it as an innovation on the Episcopal bench.

Of different styles of wearing the beard in the 19th century the "Imperial" (moustache and chin tuft) became fashionable under Napoleon III.; and the "goatee" is supposed to be specially American. In the first half of the century beards being uncommon were often regarded as betokening an eccentric and revolutionary type of mind (the view is even supported by a passage in one of Mr. Herbert Spencer's *Essays*), and were the objects of special attention by the police of some Continental countries.

Bearing, in *Navigation* and *Hydrography*, the distance and direction of one object from another. Bearings of fixed objects are given as seen from seaward, and, except when otherwise expressed, are to be accepted as magnetic.

Bearings, in *Mechanical Engineering*, are those parts of the framework of a machine that support the rotating pieces, or are supported by them. That part of the rotating piece which fits in the bearing is called the *journal*, generally of cylindrical section. That portion of the bearing immediately in contact with the journal is called the *bush*, and is made of material somewhat softer than the journal, such as brass, gun-metal, or, in special cases, lignum-vitæ. For the journal to rotate easily in the bearing it must be everywhere circular in section, it must fit the bearing accurately, and must admit of convenient lubrication (q.v.), the nature of which will depend on the speed of rotation and on the pressure at the bearing.

Ball-bearings have a special interest on account of their extensive application to cycles. In this case the journal does not fit accurately into the hollow cylindrical bush as usual, but is supported by a number of small steel balls fitting into a groove cut to contain them. The rolling-friction here, which replaces the ordinary rubbing-friction, is very small, and easy working at the bearing is ensured.

Bear Lake, GREAT, an extensive and irregularly-shaped sheet of fresh water, in the N.E. of Canada, is intersected by the arctic circle. Its estimated area is 14,000 square miles, and its height above sea-level 200 feet. Its surplus waters are carried by the Bear Lake river into the Mackenzie river.

Bearn, an old province of France of which the capital was Pau, now forms the greater portion of the department of Basses-Pyrénées. It became an appanage of the crown of France in the person of Henry IV., who was a descendant of the family of Foix, the rulers of Bearn, and who, because he was born and brought up there, was nicknamed the Bearnois. Not until 1620 was it formally incorporated with France by Louis XIII., and up to 1790 it continued to be governed by its own constitution.

Bear River, a river of the United States, rises in the north part of Utah; and, after flowing northward through Idaho, re-enters Utah, and flows into the Great Salt Lake. Though it is 450 miles in length, yet the distance from its mouth to its source in a straight line is only 90 miles.

Beas, or BIAS, ancient name *Hyphasis*, with the rivers Jelum, Chenab, Ravee, and Sutlej, comprises the five rivers that gives its name to the Punjab. It rises in the Himalaya mountains 13,300 feet above sea-level, and after a south-westerly course for 350 miles joins the Sutlej.

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